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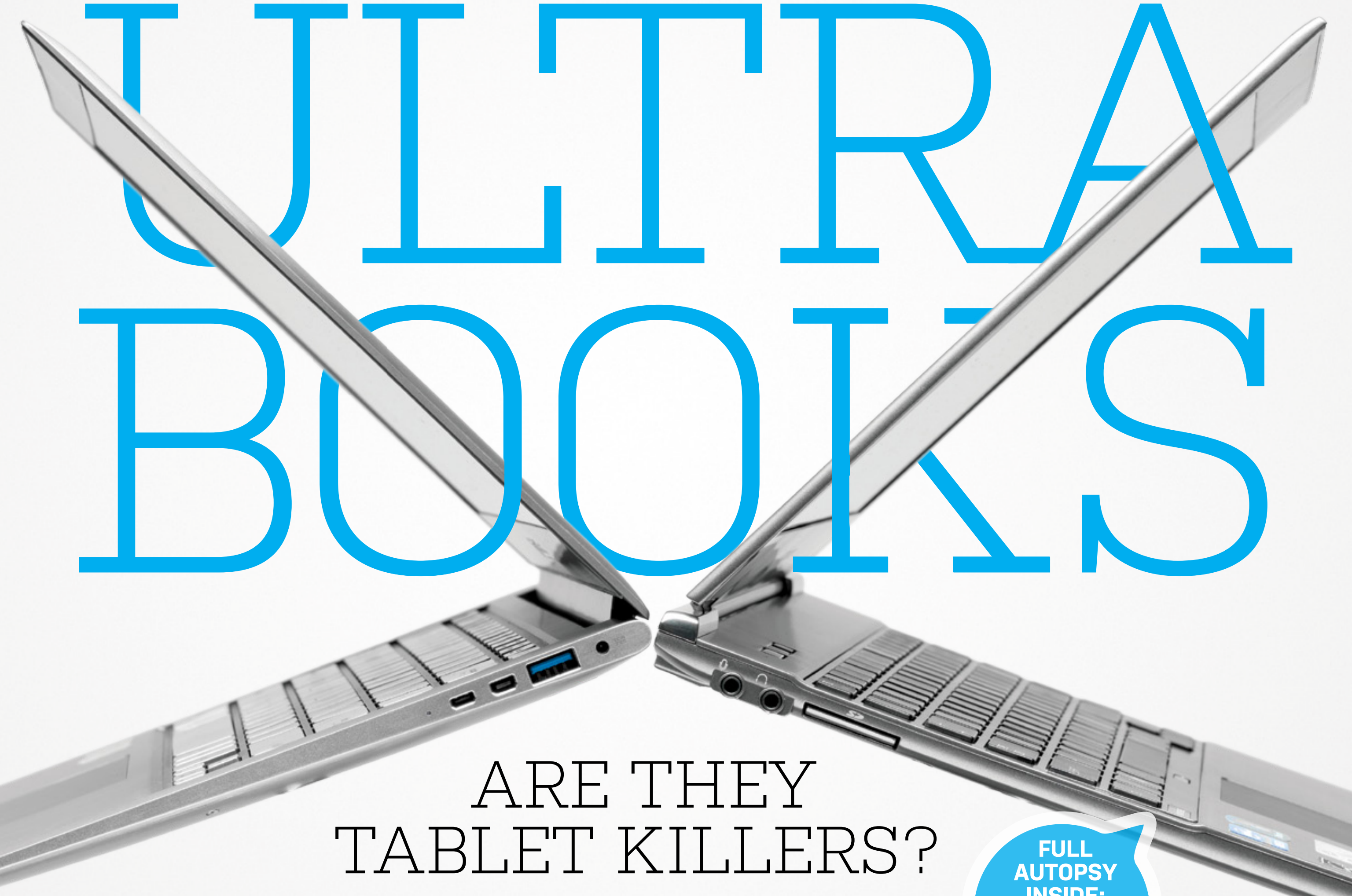

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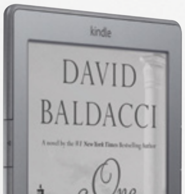

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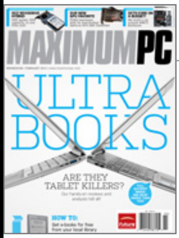

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Photography by Mark Madeo

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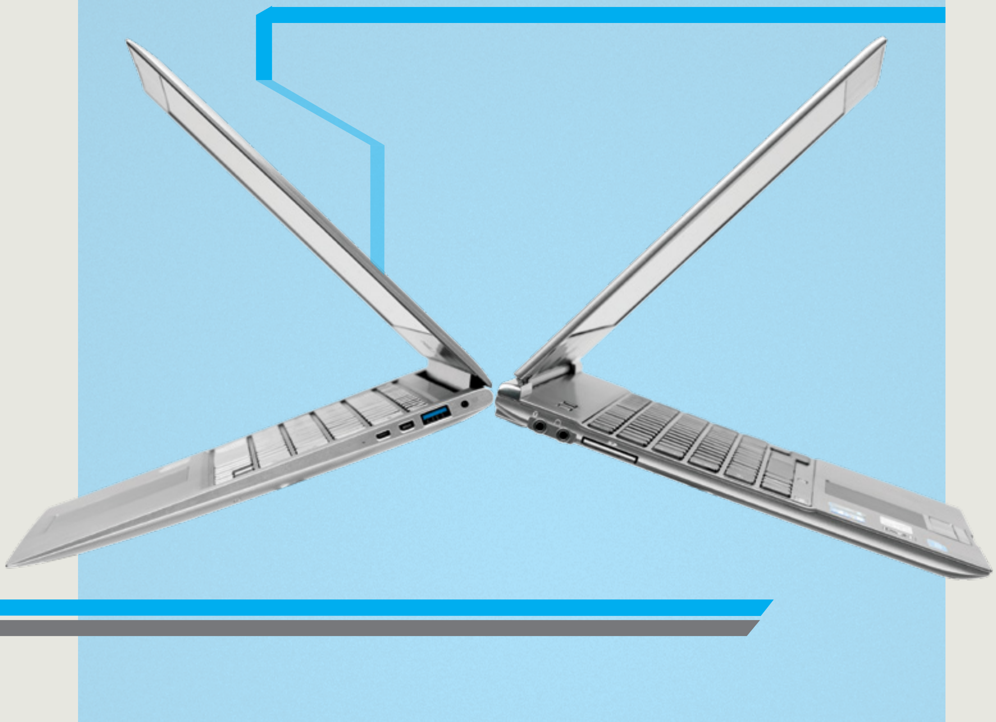

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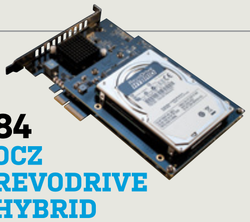

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MAXIMUM PC

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Gordon Mah Ung

COLD CASE: WHO TRIED TO KILL PC GAMING?

I'VE BEEN THE LEAD investigator on one of the most important unsolved cases of our time: Who tried to kill PC Gaming? Luckily, the perpetrator failed and PC Gaming is on the road to recovery, but the question remains: Who tried to kill him?

First, I'll admit that PC Gaming has never been an easy person to get along with. Cantankerous, moody, and a serious pain in the ass, you can bet there's a long list of folks with motive to 187 PC Gaming.

To expedite solving the case, I'm now revealing more details of my investigation, including some of the persons of interest and the current theories behind this crime.

Obviously, the three Console Brothers were immediate suspects. All were interrogated at length, and while they have malice in their hearts, and have exhibited extreme jealousy, envy, and pettiness over PC Gaming's superior talents, I'm confident that none of the Brothers committed the crime. Well, I'm confident none of them could actually succeed. That's despite immense wealth, power, and the fact that one of them shares a common parent with the victim. They just don't have the skills or the guts to pull it off.

Early on, I also had a strong suspicion that it wasn't a person or entity that tried to off PC Gaming, but a condition known as Bad Driver disease, which afflicts every piece of advanced hardware in the world. Yes, Bad Driver disease is indeed partially to blame for PC Gaming's exposure to harm, but Bad Driver disease is just something everyone has learned to live with as a medical condition, and not a stone-cold killer.

That brought me to the Media. The truth is, no one likes the Media, not even the Media, so it was immediately blamed for trying to suffocate PC Gaming with overly critical, unfair, and generally whiny reviews. Some believed that the three Console Brothers, in fact, were behind the Media's attitude toward PC Gaming, but there's no evidence of that. As much as I disdain the press, I've cleared the Media as a suspect.

Certainly Brigands were looked at, too. Those highway robbers who stole everything they could from PC Gaming have blood on their hands for sure, but PC Gaming stopped using those dangerous roads years ago, so open-road piracy is no longer the threat it once was.

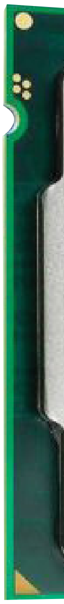
That brought me to the most likely suspect: Integrated Graphics. This slovenly, lazy, good-for-nothing bum has been loafing around PC Gaming's estate for years. Let's face it, since he was born, Integrated Graphics has been a waste of silicon. If PC Gaming was invited to a mainstream gaming party, Integrated Graphics would tag along, and PC Gaming would immediately be kicked out. That's not a motive for murder though; IG is just an annoying, freeloading bum looking for someone to pay for his carpet cleaning. In recent years, however, Integrated Graphics has found religion, gotten a shave and haircut, and is on the path to becoming an upstanding citizen.

Unfortunately, with all of the prime suspects eliminated, my case is at a standstill. That's why *Maximum PC* is turning to the public for help. Send your tips and theories about who tried to kill PC Gaming to comments@maximumpc.com.

Gordon Mah Ung is Maximum PC's deputy editor, senior hardware expert, and all-around muckraker.

↘ submit your questions to: comments@maximumpc.com

THE NEWS



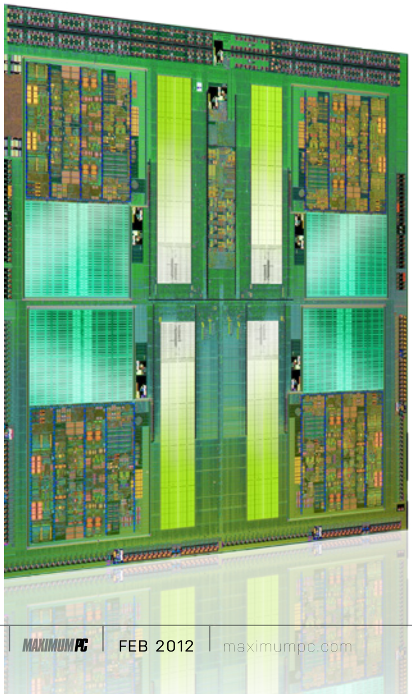
AMD at a Crossroads

Company's missteps put it at an "inflection point"

KLINGONS HAVE a phrase for where AMD is right now: Tah Pagh TaHbe'. In English, you probably recognize it as, "To be, or not to be?"

The future of the company is in question following a series of very public missteps. AMD's new chip, Bulldozer, shipped late and to underwhelming reviews across the globe. That was followed by news reports at ExtremeTech that AMD would execute a do-over on its planned 28nm APU and shift fabs from GlobalFoundries to TSMC. Such a move would force a redesign of the chip and a significant delay. More recently, the company demonstrated a lack of grasp over the most basic facts, such as how many transistors are in its new CPUs.

AMD launched Bulldozer touting its 2 billion transistors. Months later, the company sheepishly admitted that Bulldozers actually have only 1.2 billion transistors. How can a company misplace 800 million transistors on such an important product? It's likely a simple oversight during the release, but it didn't help that soon after the launch, AMD sacked 10 percent of its work force, including most of its press liaisons.



AMD's initial information that the Bulldozer die packs 2 billion transistors was off by 800 million transistors.

With such bad news, who needs an enemy that's 10 times your size and flush with cash, as well as an army of ARM-based ankle biters coming at you? That question leads one financial analyst to downgrade AMD to a sell rating.

"AMD is on the verge of sinking into irrelevancy as ARM-based competitors gain share in low-end computing, and Intel extends its advantages in performance and manufacturing," says Daniel Berenbaum of MKM Partners. "It's difficult to remember the last product AMD launched on time, and it is now evident that, even aside from manufacturing challenges with GlobalFoundries, AMD's technology roadmap is severely lagging."

The biggest blow to confidence among AMD enthusiasts, though, may be a report that AMD was throwing in the towel completely on x86 to focus on ARM chips (AMD has long held an ARM license). The rumors started flying after AMD spokesman Mike Silverman told a reporter that AMD was at a crossroads. "We are at an inflection point," Silverman told the *San Jose Mercury News*. "We will all need to let go of the old 'AMD versus Intel' mindset, because it won't be about that anymore."

With hearts broken over Bulldozer's performance, that's all it took for websites and forums to chitter about AMD quitting x86. AMD officials quickly said those assumptions were wrong; it is committed to x86 and even plans to iterate Bulldozer next year on schedule with Piledriver. Even then, the company acknowledges, the future will be different.

"AMD is making business decisions based on market moves. Based on market projections and strong sales of our A-series, C-series, and E-series APUs, we see a continued shift in demand for processors that combine the power of the CPU and the GPU in client platforms. This represents the largest part of the client market," says an AMD spokesman. "For desktop enthusiast customers, we believe that this market is primarily driven by GPU performance—with the CPU playing a supporting role—and AMD is addressing this market with a new range of powerful graphics cards that enable the ultimate enthusiast experience. We will continue to deliver high-end desktop CPUs that offer optimal performance as part of a balanced PC system." **–GORDON MAH UNG**

Leaked Details Lift Fog over Ivy Bridge

If you're itchin' for Ivy Bridge, some soothing media leaks offer a preview of the chip's performance. X-bit Laboratories obtained documents that Intel gave to some of its partners detailing models, performance stats, and a release window for the Ivy Bridge family of Q2 2012. There were 18 models listed—10 of the ultra-low voltage variety.

For Ivy Bridge, Intel prioritized reduced power consumption and improved integrated graphics performance. The leaked documents show success in those areas, but more modest gains in CPU performance. On average, Ivy Bridge chips required 19 percent less power than Sandy Bridge equivalents.

Benchmark tests compared a 3.4GHz Ivy Bridge i7-3770 to a 3.4GHz Sandy Bridge i7-2600, and the graphics performance for Ivy Bridge more than doubled that of Sandy Bridge in 3DMark Vantage benchmark tests. Five reported CPU benchmark tests resulted in gains for Ivy Bridge of 7 percent (SYSmark 2012), 13 percent (ProShow Gold 4.5), 14 percent (HDXPRT 2011), 15 percent (Cinebench 11.5), and 25 percent (Excel 2010 performance).

Naturally, all these leaked accounts should be taken with a grain of salt. We won't be able to confirm the models and especially performance numbers until we have the new chips in our hands. However, a second leaked report from Russian site Overclockers.ru also identified the same Ivy Bridge model numbers and specs that X-bit Labs did. You can find a chart of all 18 models on our site at bit.ly/u3lNul. **–MR**

Your Smartphone or Your Life

Smartphones are increasingly a thief's object of choice—especially in San Francisco, where a rash of cell phone robberies on December 5 resulted in one man being stabbed over his phone. *San Francisco Examiner* reported on the details of the thefts, which occurred on public transit over a four hour period; three of the victims were assaulted, which is increasingly the norm with cell phone muggings. SFGate.com reported that more than 40 cell phone robberies were reported in November, with virtually all of them involving a weapon or physical assault. A commander of the SFPD's Municipal Transport Agency operations recommended that riders keep devices in their pockets to discourage theft. **–AB**

FCC Smacks Down AT&T/T-Mobile Merger

It was up to AT&T to convince U.S. regulators that its proposed $39 billion takeover of T-Mobile was in the public's best interest. Among the list of concerns in the Federal Communications Commission's 109-page November report is that the merger would result in heavy job losses. The FCC also believes AT&T will expand high-speed wireless Internet infrastructures even without the merger, negating one of the deal's supposed benefits.

"The applicants failed to meet their burden of demonstrating that the competitive harms from the proposed transaction are outweighed by the claimed benefits," the FCC wrote. However, the FCC let AT&T withdraw its application, meaning the wireless telco can submit a new one at any time. **–PL**

Tom Halfhill
Fast Forward

MULTIPLE MULTICORE MANIFESTATIONS

IT'S BEEN about 10 years since multicore processors burst on the scene, and we're now seeing several innovative variations. At first, chip designers simply replicated CPU cores, filling their silicon with copies of the same brain. Now they are exploring alternatives—and these variations will change the way we benchmark performance and compare processors.

A basic symmetric or homogeneous design has two or more CPU cores of the same type running at the same clock speed. As the number of cores grows, however, this approach becomes less power-efficient, and the software struggles to use all the cores. So AMD and Intel introduced "turbo" technology that can run the CPUs at different clock speeds, which saves power and scales performance with demand.

AMD's Bulldozer processors have pairs of cores that share some internal resources. They are similar to Intel's multithreaded cores, and both techniques will continue to evolve. Some embedded processors have four or more threads per core.

To conserve power in mobile phones and tablets, ARM and Marvell have designed asymmetric or heterogeneous CPU clusters. ARM calls its strategy "big.LITTLE"—a big core sleeps while a little core handles routine chores. When the user needs more performance, the big core awakens and helps little brother. Someday, PC processors will do this, too.

Freescale and Texas Instruments have chips that combine conventional CPU cores with a digital-signal controller (DSC) or digital-signal processor (DSP). The CPU runs application software while the DSC or DSP controls a motor or decodes wireless signals. PC processors could do this, too, although DSP instruction-set extensions may be an acceptable substitute.

As these and other variations proliferate, processor benchmarking and comparisons will become more difficult. But for PCs, smartphones, tablets, and other devices running highly variable workloads, the power efficiency of asymmetric multiprocessing will override other considerations.

Tom Halfhill was formerly a senior editor for *Byte* magazine and is now an analyst for *Microprocessor Report*.

Thomas McDonald
Game Theory

WHAT MATTERS MOST?

WHAT MATTERS most when you game? I imagine we each have a different answer, and that answer may change with time. After many years of playing military shooters, I finally realized this month that I've had enough. I'll certainly go on steering around my little guy as he bobs behind an iron site in a brownish-grayish world, but I won't miss the genre if it vanishes. If someone told me, "I'll take every Call of Duty game past and future away from you, and give you a single Nilla Wafer in return," my response would be, "Holy crap! I *love* Nilla Wafers! What a deal!"

I spent a blessedly brief amount of time with Modern Warfare 3 before both Skyrim and the Xbox version of Batman: Arkham City (available for PC, too) landed on my desk, after which everything became a gray haze of pointless running about and shooting.

Skyrim isn't a vast step beyond Oblivion or Fallout 3. Most of the same pieces are still there, but the world is so flawlessly created, perfectly realized, utterly beautiful, and endlessly fascinating that it feels like an entirely new experience. After spending 30 hours in the game, I still don't want to leave.

It does things only games can do. No TV miniseries, not even something like *Game of Thrones*, could possibly achieve this level of epic adventure and storytelling, this kind of intricate interweaving of people and factions and motivations. In a different way, Arkham City accomplishes something similar: the amazing creation of a place you just want to live in for a while.

These are not worlds to run through; they are places in which to linger. That's the key difference that makes a game worthwhile. Like a favorite place or a good book, it's something you want to make last. To me, now, that's what matters most.

You can follow Thomas McDonald on Twitter @StateOfPlayBlog.

Epson Label-Works LW-400

We might be utter slobs during the rest of our existence, but we turn obsessive/compulsive when it comes to everything from wiring our computer to organizing our closet. Epson's Label-Works LW-400 ($50, www.epson.com) printer was made for geeks like us.

This battery-operated, handheld printer produces labels up to 3/4-inch wide. It can print 14 font types in 10 styles, 300 symbols and icons, and barcodes on a variety of label stock, including white, clear, metallic, and iron-on. You can preview labels on the backlit LCD and store up to 50 label designs in onboard memory. The LW-400 is particularly good for making flag and collar labels to wrap around cables. Split backing makes the labels easy to peel, but the cartridges are pricey, ranging from $18 for 30 feet of 1/2-inch black-on-clear, to an eye-popping $41 for five feet of 3/4-inch black-on-glow-in-the-dark. –**MB**

DLNA Adds Support for Wi-Fi Direct

Playing digital content from one device on another device soon will become much easier, as the Digital Living Network Alliance (DLNA) has added Wi-Fi Direct interoperability into its standards.

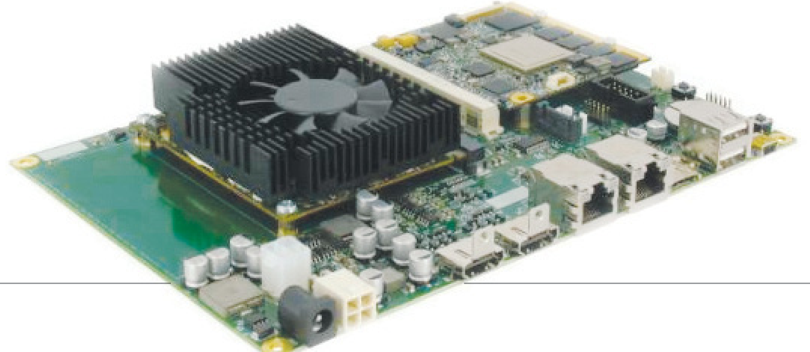
Wi-Fi Direct basically lets two Wi-Fi-enabled devices communicate directly—no local WLAN or Wi-Fi network needed—as long as one of those devices is Wi-Fi Direct certified. It's a fairly new technology that's expected to be adopted steadily over the next five years. But if you want the technology now, you can check out the Wi-Fi Alliance's list of Wi-Fi Direct certified products at bit.ly/k6sOcx. –**BC**

First ARM-based Supercomputer Under Way

Nvidia's Tegra ARM CPUs are hitching a ride to Spain, where the Barcelona Supercomputing Center (BSC) is developing a hybrid supercomputer—the first one to combine quad-core Tegras with high-performance Nvidia CUDA GPUs. BSC expects two to five times greater energy efficiency compared with today's most efficient systems.

The long-term goal of the so-called Mont-Blanc Project is exascale-level performance using 15 to 30 times less power than current supercomputers.

"While ARM was originally designed for extremely small and low-power embedded devices," says Nvidia's Sumit Gupta, "Intel and AMD x86 CPUs were always trying to make Windows run faster, with little consideration for power consumption." –**PL**



Quinn Norton
Byte Rights

IN AMERICA, PHONE LISTENS TO YOU

FOR YEARS Carrier IQ has been building a cross-platform rootkit for phones, and carriers and manufacturers have been installing it hidden on their handsets. About 150 million phones have been toting it around, and—surprise!—you very well may have been sending your information through it.

The software was documented by an Android researcher, Trevor Eckhart, in a blog post eerily reminiscent of the Sony rootkit debacle of 2005. He found hooks into every press on his HTC, like an über-keylogger baked into the system. Carrier IQ charmingly replied with a cease-and-desist legal nastygram and then backed off after getting slapped upside the lawyer by the Electronic Frontier Foundation. The company said "sorry" and got conciliatory, explaining that it didn't keylog. It *probably* doesn't. What it does depends entirely on what the carrier wants, and no one is telling what each carrier asks for. It's unclear what Carrier IQ actually gathers, or transmits. However, it's not unclear what it could be doing.

Now its facing federal and state suits, both civil and criminal, for privacy violations and federal wiretap laws.

In a way, though, Carrier IQ is getting a bad rap. All of this invasion is essentially part of walking around with a pocket full of software written for someone else. Carrier IQ, HTC, and even Apple have the same real customer: the carriers. Those carriers have reasons, both practical and annoying (read: service improvement and selling you crap, respectively) for wanting to monitor your every move. It's a safe bet that the carriers not implicated in the Carrier IQ disaster have escaped public wrath by mainly using a software package Trevor Eckhart hasn't found yet.

So what can you do? Void your warranty. Install firmware made by and for users. The nice thing is that since it's written for you, it works better anyway.

Quinn Norton writes about copyright for Wired News and other publications.

After Floods, Dry Year Ahead for HDDs

While Western Digital resumed partial production of hard drives in Thailand in December—ahead of schedule—the overall outlook for getting global HDD shipments back to pre-flood levels looks grim. Seagate CEO Stephen J. Luczo thinks it will be the end of 2012 before full production resumes, and even longer to reach pre-flood pricing.

Many businesses, such as Puget Systems, have been stockpiling HDD supplies to try to hold off shortages. Meanwhile, a director at Kingston believes higher HDD prices combined with falling flash memory prices will drive the conversion to SSDs, which he believes will cost $1 per GB by the end of 2012. –**MR**

Battery Life Extension Discovered

In a breakthrough with implications for everything from cell phones to electric cars, a Northwestern University engineering team has improved energy capacity and charge rate in lithium-ion batteries by a factor of 10. Professor Harold H. Kung says, "Even after 150 charges... the battery is still five times more effective than lithium-ion batteries on the market today."

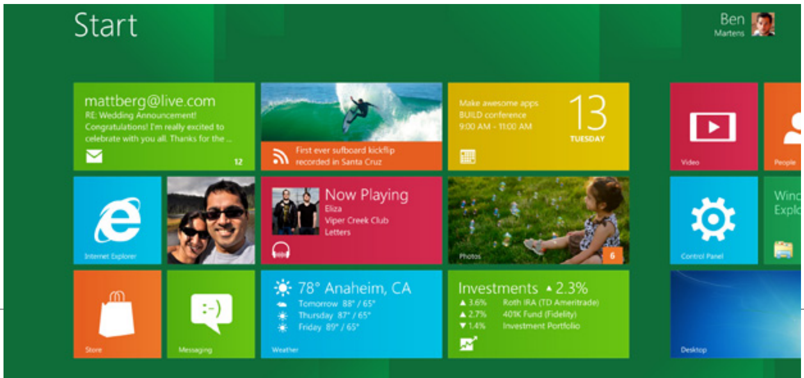
Kung's research team sandwiched clusters of silicon between graphene sheets to allow for a greater number of lithium atoms in the electrode while utilizing the flexibility of graphene sheets to accommodate the volume changes of silicon during use. They also used a chemical oxidation process to create 10-20nm holes in the graphene sheets, so the lithium ions would have a "shortcut" into the anode and be stored there by reaction with silicon. That reduces the time it takes the battery to recharge. –**PC**

Windows 8 Watch

ARM Notebook PCs Will Follow Tablets

In the run up to the Windows 8 launch, some amount of intrigue surrounds how its new compatibility with ARM-based chips will develop. Windows Weekly co-host and Microsoft insider Paul Thurrott says that Redmond's finest may be nixing the Windows desktop from Windows on ARM (WOA) tablets, limiting them to the Metro interface. That could be a second significant restriction for WOA tablets; the first inherent to all WOA machines: They won't run legacy software written for XP, Vista, or Windows 7.

Regardless, Qualcomm is working to ensure that there will be Snapdragon Windows 8 PCs in some form—most likely tablets to start—in 2012. Executive VP Steve Mollenkopf isn't worried about the software restrictions and believes the applications people really care about will be rewritten for ARM. Digitimes has also reported that both Qualcomm and Nvidia are working with notebook players such as Asustek and Lenovo to ensure that WOA laptops will test the waters in mid-2013, and grow to be a force by 2014-2015. –**MR**



THE LIST

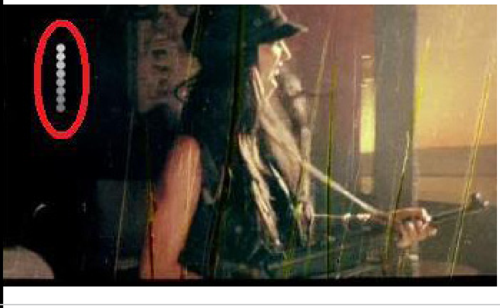
8 GOOGLE EASTER EGGS

8 GOOGLE'S CALCULATOR FUNCTIONS

Includes all kinds of joke units, including donkeypower, Potrzebie, "number of horns on a unicorn," and a "beard second."

7 YOUTUBE'S SNAKE MINIGAME

Play a video, then press and hold the up and left arrows on your keyboard. Presto! Now don't hit a wall or run the snake into itself.

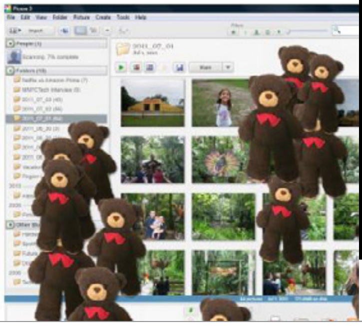


6 ASKEW/TILT

Searching for "askew" turns the screen askew. You get the same result searching for "tilt."

PICASA BEARS 5

Press Crtl + Shift + Y and you'll see a bear. Do it over and over again and you'll see a veritable army of bears!



4 GOOGLE DEFAULT LANGUAGE

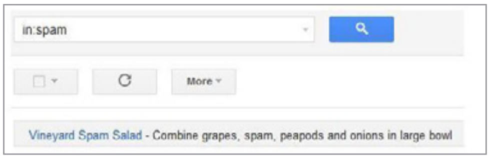
Change Google's default language to nifty things like Sesame Street's Swedish chef. Searching for "xx-pirate," "xx-klingon," "xx-bork," "xx-piglatin," and "600673" brings up landing pages for those themes, as well.

3 COLONEL SANDERS

Finding the KFC colonel's logo in Google Earth? Finger-lickin' awesome. Fly to these coordinates: 37°38'46.50"N 115°45'2.98"W.

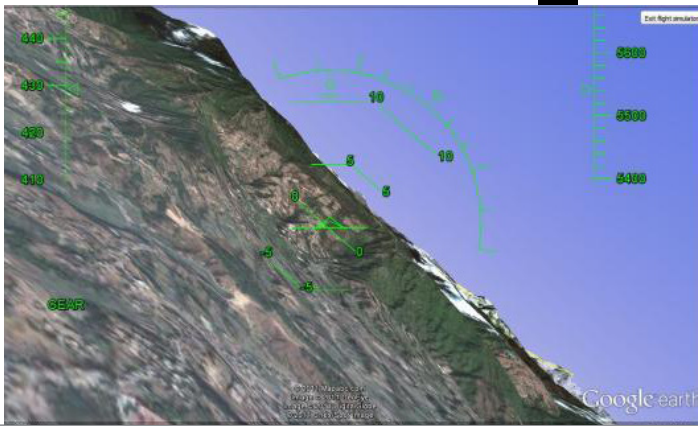
2 GMAIL SPAM RECIPE

If you check out the ad at the top of your Spam folder, you might just find yourself delighted by a delicious Spam recipe.



1 FLIGHT SIMULATOR

Buried inside Google Earth, this used to be a hidden feature accessed by pressing Ctrl + Alt + A; newer versions allow access from the Tools menu.



HEAD TO

BY BRAD CHACOS

Amazon Kindle Fire vs. Barnes & Noble Nook Tablet

If you can't beat Apple's iPad, change the rules of the game. Amazon and Barnes & Noble are taking a bath on sales of the $199 Kindle Fire and the $249 Nook Tablet, respectively, and making up for it with profits on sales of electronic merchandise (e-books, videos, music, and apps). The strategy has succeeded in moving a lot of hardware, with each company on track to sell millions of units (although the ratio of Kindle Fire to Nook Tablet sales is greatly in Amazon's favor so far). Both tablets feature nearly identical 7-inch, 1024x600 LCDs and rely on Wi-Fi for connectivity. Which should tempt you away from the high-end tablets? Only a bloody-knuckled deathmatch will tell.

Round 1: Design

If a plain black slab with a screen is your cup of tea, then drink in the Kindle Fire. Its headphone output and power button (its lone hardware control) are uncomfortably close to its Micro USB port (used for charging and file transfers) across the bottom of the tablet.

No doubt the prettier option, the Nook Tablet sports a raised silver-gray bezel and coated backplate that, in concert with the hollowed-out corner for the microSD slot, give the Nook a visual flare and render it the grippier tablet. The Nook's hardware volume controls and menu button also score it points. The Kindle Fire offers two speakers to the Nook's one; but the difference is negligible, and only the Nook offers a built-in microphone.

Winner: Nook Tablet

Round 2: User Interface

Both tablets break a sweat obliterating the UI confines of the Android 2.3 OS they're built on. The Kindle Fire's bookshelf-themed homepage displays your favorite and most recently visited web pages, apps, documents, and more, with menu tabs labeled Books, Music, Video, Apps, Web, and so on. It's a departure from the stock Android UI, but it's more user friendly than the Nook Tablet's storefront-feeling UI, which also insists on using "shelves" to display your various media, apps, and files. The Nook Tablet, on the other hand, preserves more Android functionality, including customizable home screens that help you bypass its convoluted Library shelves. The Nook Tablet's browser displays more web-page content per screen; and we like its hard menu button, which calls up a shortcut menu for apps, URLs, settings, and more.

Winner: Nook Tablet

Round 3: Storage

You might think that the Nook Tablet's 16GB of onboard memory combined with its microSD slot means game over for the 8GB, nonexpandable Kindle Fire. But the Nook Tablet reserves most of its onboard memory for content purchased from Barnes & Noble, leaving you just 1GB for everything else. The playing field levels further when you take into account Amazon's free cloud storage for all Amazon media purchases, plus the 5GB of free cloud storage the company provides for storing your files. The Nook Tablet can accommodate a microSD card with up to 32GB of capacity, but no card of any capacity is included in the purchase price. What's more, you must use a computer to transfer files from a memory card to its internal memory. Such lameness defies description, leaving this round a push.

Winner: Tie

Round 4: Performance

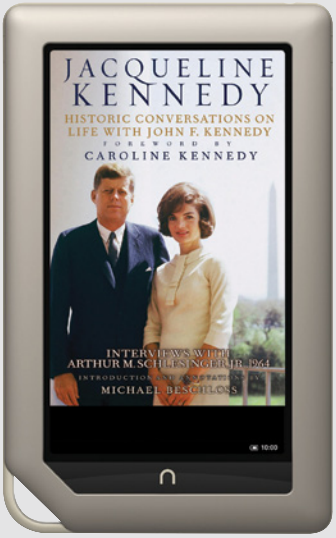
While both contestants enter the ring armed with 1GHz dual-core CPUs, the Nook Tablet packs 1GB RAM while the Fire has just 512MB. The Nook Tablet's additional memory resulted in smoother screen refreshes while reading, web browsing, playing games, streaming video, and so on. Netflix video streams looked much better on the Nook Tablet, and it delivered slightly longer battery life: We streamed Netflix videos on it for more than six hours. B&N's device delivered better touchscreen responsiveness, too; there were far too many times when we had to repeatedly tap the Fire's screen before it would register.

Amazon's much-hyped Silk browser put a hurt on the Nook Tablet's browser in terms of the SunSpider and BrowserMark benchmarks, consistently outperforming the Nook by 25 to 40 percent. In real-world use, however, the Nook Tablet loaded websites as fast or faster than the Fire.

Winner: Nook Tablet

HEAD

Like the Nook, the Kindle Fire experience relies on your burning desire for consuming magazines, books, videos, and more through its compact form factor.



At 14.1 ounces, the wider, longer, thinner Nook Tablet weighs a half-ounce less than the Fire.

Round 5: Content Ecosystem

Barnes & Noble claims to stock "thousands" of apps in the Nook store. After browsing the entire site, we'd say "hundreds" is more like it. A vast number of popular Android apps are MIA here, and many apps that are free in other marketplaces must be purchased for the Nook Tablet. Unlike the Fire, the Nook Tablet will not sideload apps, either; it refuses to even recognize .apk files. Amazon's app store, by comparison, is a Shangri-La of software choices. While it could be argued that the Kindle and Nook e-reader systems are roughly equal in both features and inventory, Amazon's music and video marketplace is far more robust, and Amazon has the aforementioned cloud storage plus superior tools for synching your purchases to multiple devices. And for $79 per year, Amazon Prime serves up thousands of free movies and TV shows, Kindle book borrowing, and free two-day shipping for Amazon orders.

Winner: Tie

And the Winner Is...

The Nook Tablet was ahead on points going into the final round, but the Kindle Fire unleashed a flurry of value-added blows in the form of Amazon's cloud storage, massive music and video library (available for sale or rent), and decent app store that knocked the Nook into sweet oblivion. Superior hardware empowers the Nook Tablet to beat the Kindle Fire in some areas (particularly video streaming), but Barnes & Noble's device is just too limited to be a full-featured tablet. Our opinion might change once we can jailbreak it and install a custom ROM, but the **Kindle Fire** is the better tablet right out of the box.

DOCTOR

THIS MONTH THE DOCTOR TACKLES...

>SSD Installs
>HTPC Graphics
>Data Recovery x2

NAS Appeal

I have a Synology DS210j NAS with two 1TB drives in a mirrored config. This thing is great. I have everything backed up on it, and I have a DDNS setup, so I can connect remotely and use the Synology iPhone app to connect to it.

Now to my problem. I don't trust having one copy of my files in one place. I would like to back up my DS210j to an external USB drive (that is plugged into the DS210j), which I store at my work. I have been doing this manually, but is there a way to do this automatically so I don't have to copy everything every couple of weeks? I was thinking of using SyncBack, but I think if I do it over the network, it will take forever. Is there an easier way to back up my DS210j to an external USB drive?

—Joe Lentine

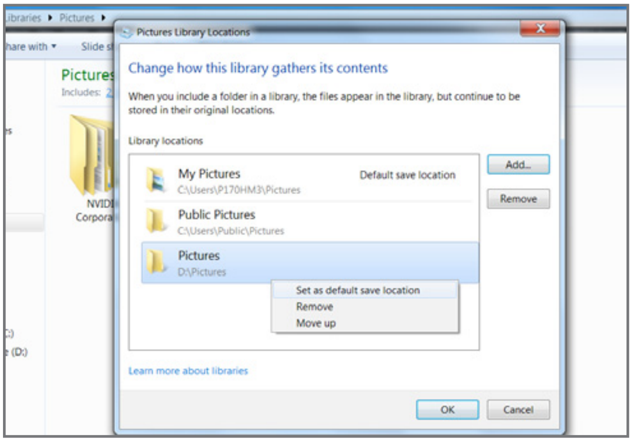
THE DOCTOR RESPONDS: There sure is, Joe. First, update your version of Synology's DiskStation Manager to the most recent version: 3.2. Then log in to your DiskStation's web GUI and click the little arrow in the top-left to select Backup and Restore. Click Create, name your backup, select Local Backup as its type, and then hit Next. Under Destination, choose your external USB device. Click Next and choose which applications to back up, if any. On the next screen, select Enable Backup Schedule, choose the frequency, and you're all set!

SSD Installation

I have been looking into solid-state drives, and although I have replaced faulty hard drives in my rig and reinstalled the operating system, I have a question. When you install an SSD and you have two or more other hard drives in your rig, you need to tell Windows which hard drive to install to. Where I get confused is when you install the operating system to, say, the C: drive (or SSD, which I suspect is only for the operating system), how do the folders My Documents, My Pictures, etc., get installed to another drive like a 2TB SATA drive for saving files if the SSD only contains the operating system?

—Travis Freed

THE DOCTOR RESPONDS: Don't worry about moving those folders over until after Windows has installed. You can use symbolic links to move the folders to your hard drive, but that might be overkill. Instead, you can set your libraries' default locations to folders on your storage drive. Open one of your libraries. At the top you'll see "Includes: x locations." Click where it says the number of locations. This opens a dialog box that lets you add folders to your library. Select Add and navigate to a new folder on your storage drive—for example, D:\Pictures. Click Include Folder, and in the dialog box, right-click it and select "Set as default save location." Repeat this for all your libraries. That should ensure that your documents end up on your 2TB drive instead of your SSD.



Set your library's default save location to a larger drive to avoid running out of space on your SSD.

HTPC, Hold the Graphics

With the integrated graphics now provided in the latest Intel chipsets, is it necessary to have a dedicated graphics card in order to build a good HTPC? A client would like me to build an HTPC and will need to decode/encode high-definition video streams. I'm wondering if I can just grab a Z68 motherboard and a Core i5-2500K and use the onboard HDMI plug to hook it up to his TV, or should I have him invest in a low-end graphics card?

—Alexandre Pauwels

THE DOCTOR RESPONDS: The Doc has a technology dictionary that, when flipped to the term "Suck Graphics" has a picture of Intel's 810 "Whitney" chip. Fortunately for us all, Intel has come a hell of a long way toward repairing its reputation for horribly bad integrated graphics. The

↘ submit your questions to: doctor@maximumpc.com

integrated graphics core in a Sandy Bridge Core i5-2500K is surprisingly good for what you want to do and also for casual gaming. It will even decode Blu-ray 3D to a TV and offer lossless audio over HDMI, so it's actually a perfect fit for HDTV purposes.

Boxee Buffer Bungle

I recently found that the cause of frequent video interrupts between my computer and a Boxee Box was the result of using the SMB file system. I installed NFS, and I no longer have a buffering problem. But it begs the question: Can SMB handle loads greater than 40Mb/s? If so, can you recommend a software program that manipulates SMB settings for an average user? I have spent considerable time trying to figure it out and am sure it is an SMB issue; I just don't know how to manipulate SMB to run faster. There is no way to adjust SMB on the Boxee Box.

—Norm

THE DOCTOR RESPONDS: The problem isn't with SMB, per se, but with how the Boxee Box supports it. The development team released firmware (ver. 1.2.1.20451) that was largely aimed at squashing SMB bugs. But if you're satisfied with NFS, the Doc suggests you just stick with that.

Dream-Killing Graphics Card

I just rebuilt my PC and modeled it after your Dream Machine 2011. I used the same mobo, processor, memory, Windows, and graphics card. I got everything hooked up and powered up fine, except I had no video to my monitor. I hooked up an alternate graphics card, and it worked fine. I was able to install Windows fine, as well. I unhooked the alternate graphics card and hooked up the new EVGA GeForce GTX 580 SuperClocked card again and had the same result: no video to my monitor. I took it to Best Buy, where they tried preinstalling my new drivers and then installing the G-card, but I still had the same problem. They had no idea what could be causing this. I figured maybe you ran into the same issue and had ideas on how to help me solve it. I can't express my frustration enough. Thanks so much.

—Chris Dennis

THE DOCTOR RESPONDS: There were no issues like yours when running the Dream Machine, but it sounds like the one thing you didn't do was actually test the new videocard. On occasion, the Doc has seen dead videocards, so you should put that new GPU into another machine to verify that it works. If it does, then you should start looking at other possibilities, such as your power supply not being up to snuff or whether you are using the correct power connectors for the GPU. If it is a modular PSU and the GPU cables can be removed, check that those cables are firmly seated in the PSU, as well. There is also a very remote chance that your board needs a BIOS update to recognize the card. That's unlikely since the card isn't overly exotic, but you may want to consider updating the BIOS on the motherboard before you begin RMA'ing parts.

HDD Data Recovery

I did something really stupid. I quick-formatted my external hard drive, but I stopped in the middle before it completed. Now I can't access my drive. Every time I try, I get the message "Format your drive before use." How can I recover my data?

—Jorge Alvarado

THE DOCTOR RESPONDS: As long as you haven't overwritten the data, you should be able to get it back fairly easily. Don't reformat your drive yet. Try a free recovery utility like Recuva (www.recuva.com), which should be able to recover most of your files.

> “AS LONG AS YOU HAVEN'T OVERWRITTEN THE DATA, YOU SHOULD BE ABLE TO GET IT BACK FAIRLY EASILY

DLNA Dilemma

I have been using the Samsung PC Share Manager DLNA software that came with my TV to share video files on my home network, but the software is very slow and unstable. It takes forever to browse video files and get to the file I want to watch. I recently tried TVersity instead and found that it is more stable and faster to navigate to the files. However, I can no longer fast-forward or reverse while watching shows like I could with the Samsung software. What DLNA server do you prefer or believe is the best? Is the Pro version of TVersity worth it, or should I pay for something like Mezzmo, Twonky, or Nero MediaHome 4?

—Andrew Costa

THE DOCTOR RESPONDS: TVersity is a great program, especially since there's a free version available (www.tversity.com). The paid version ($40) won't address the shortcoming you described. It will enable you to stream premium web video, such as Hulu, to networked media players, but if you're using a PC, that's not a feature you need. If TVersity is not meeting your needs, take a look at PacketVideo's TwonkyServer (www.twonky.com). Download the trial version first, though, because a license will cost you $20.

No-Disk Windows Install

I have a Dell Inspiron B130 laptop that I got used. It came with Windows Vista, but now runs Windows 7. I'm planning to replace it, and want to clear my data off of it beforehand. I would like to wipe the hard drive and reinstall Windows 7 on it. However, I got the laptop used, and I don't have any startup disks—not the Dell or Windows 7 disks. I noticed that one of the programs on the laptop is called Dell Support System, which has a utility called Data Safe Local Backup. I tried to use this, but got a warning message that DSLB could not run because my hard drive doesn't have a backup copy of the factory image on it. Even if I could get a copy of the original software that came with the computer, it would be Vista, not Windows 7. Is there any way I can get a copy of the OS without buying a new one? Can I copy the OS off of the computer? Or does Microsoft offer some download option to let me put the OS back on?

—James Moats

THE DOCTOR RESPONDS: From the factory, the Inspiron B130 should have had a hidden system recovery partition with the OS on it. Reboot the machine, and when you see the blue bar on top, hit Ctrl+F11. If you time it just right (it may take a couple of tries), the notebook should boot into a utility that will let you basically reinstall the OS from the hidden partition. This will wipe the user data on the restored partition and accomplish what you want. Be advised, this will not securely erase all of your user data. A real snoop could undelete some of the files on the drive. Still, this should enable you to accomplish what you want without having to buy the OS discs.

ULTRA

WILL THIS **NEW CLASS** OF SLIM, TRIM, **RELATIVELY AFFORDABLE** PORTABLES BE THE **NEXT BIG THING**?

BY KATHERINE STEVENSON

BOOKS

YOU'D HAVE TO ACTIVELY be avoiding the tech media over the past several months not to have heard about Ultrabooks. Their coming has garnered a boatload of buzz, fueled in no small part by Intel's $300 million fund to get hardware and software makers behind the cause.

Ultrabooks are Intel's answer to the spread of ARM-based tablets—a way to capture the hearts and minds of the masses with an x86-based portable device (of the Intel persuasion, natch). To that end, Ultrabooks are required to meet a few key "desirability" standards. They must be slim, lightweight, have generous battery life, and boot and resume from hibernation in brisk fashion. It's also understood they should look cool. As Apple products so clearly demonstrate, style sells. And sure enough, Ultrabooks—at least those that have debuted so far—are heartily infused with MacBook Air influence.

So are these new, "cool" devices the next must-have products? Is all the hoopla warranted? We review the first four Ultrabooks to kick off the category. All are 13.3 inch models, but each brings its own brand of hot-newness to the table, with varying degrees of persuasiveness, as you'll see on the following pages.

Closed, the S3 cuts a more impressive figure, with its handsome brushed metal lid on display.

ACER ASPIRE S3

Priced right, but far from perfect

WHEN ULTRABOOKS were first announced it seemed doubtful that manufacturers could turn out these wannabe MacBook Airs at the sub-$1,000 price Intel was promising. Acer put those doubts to rest with the Aspire S3, which debuted at $900. Given its relative affordability, it's not surprising that the Aspire S3 makes a few compromises in its Air aspirations.

Measuring .68 inches at its thickest, the ever-so-slightly wedged three-pound chassis is matte silver throughout, save for its black rubber hinge and gray keyboard. An attractive brushed-aluminum lid lends the S3 a solid feel and a classy countenance—at least when the notebook is closed. The inside and underneath are all plastic. Nevertheless, the S3 feels rigid when held by one corner, and we like that it opens almost 180 degrees.

Overall, the S3's island keyboard is comfortable to type on, although the key press is a bit shallow and many of the oft-used keys around the periphery, such as Enter, Shift, Backspace, etc. are truncated. That's particularly true of the arrow keys, which also double as volume and screen-brightness controls. Using the S3's unified clickpad, which supports multitouch functions, didn't give us any woes.

Port selection is spare, a quality of all Ultrabooks, and here consists of a headphone/mic, a media reader, HDMI, and two USB 2.0 ports—the S3 is the only Ultrabook in this roundup not to feature USB 3.0.

Acer tapped the Core i5-2467M for processing duty. While the base clock is just 1.6GHz, it can Turbo up to 2.3GHz, and thus performed better in most benchmarks than the 2.13GHz Core i7-640LM Arrandale CPU in our zero-point ultraportable rig. The S3's lagging score in Quake III is no doubt the result of its single-channel RAM, which is particularly problematic in older titles. Conversely, its score in Quake 4 demonstrates the advances of Sandy Bridge's integrated graphics, although the gaming chops of any ultraportable out right now will be pretty limited.

In our video playback test, the S3's battery lasted five hours; it recharged to full capacity in half that time. Videos themselves looked crisp and color-accurate on the S3's 1366x768 glossy screen *if* the screen was tilted just so. Otherwise, color and detail were diminished to varying degrees.

The S3 is unique among these Ultrabooks for featuring a mechanical hard drive, but it's paired with 20GB of NAND flash for SSD caching, using Intel's Smart Response Technology (SRT). Thus, your most-often used programs benefit from the SSD's faster performance. The S3's boot time of approximately 39 seconds, however, was a good deal slower than that of the SSD competition.

Acer also offers a $1,300 S3 model with a Core i7 and a 240GB SSD. But truth be told, the body is better suited to the lower-cost category, where it must make due with the modest praise of being a decent budget option.

VERDICT 7

Acer Aspire S3

+ RIPE APPLE Sub-$1K; attractive, sturdy lid; decent performance.

– ROAD APPLE Plastic insides don't match aluminum outside; no USB 3.0; uses HDD; narrow vertical viewing angle.

$900, www.acer.com

BENCHMARKS

	ZERO POINT	
Premiere Pro CS3 (sec)	1,260	1,200
Photoshop CS3 (sec)	183.6	162.5
ProShow Producer (sec)	1,533	1,497
MainConcept (sec)	2,530	2,591 (-2.4%)
Quake III (FPS)	191.7	168.8 (-11.9%)
Quake 4 (FPS)	17	38.5 (126.5%)
Battery life (min)	240	252

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Our zero-point ultraportable is an HP EliteBook 2540p with a 2.13GHz Intel Core i7-640LM, 4GB of DDR3/1333 RAM, integrated graphics, a 250GB 5,400rpm hard drive, and Windows 7 Professional 64-bit.

SPECIFICATIONS

CPU	1.6GHz Intel Core i5-2467M
RAM	4GB DDR3/1333
Chipset	Intel UM67
Display	13.3-inch, LED-backlit, 1366x768
Storage	Hitachi 320GB HDD, 20GB SSD
Connectivity	2 USB 2.0, HDMI, headphone/mic, media reader, webcam
Lap / Carry	3 lbs, 0.3 oz / 3 lbs, 11.5 oz

Only the Portégé Z835 offers a backlit keyboard—a standard feature of the MacBook Air.

TOSHIBA PORTÉGÉ Z835

Lightest load, lowest price, least compelling

TOSHIBA DOES ACER $100 better, offering the Z835, a Best Buy exclusive, for $800. Its low price is matched by its light weight. At two pounds, 6.6 ounces, it beats all the others here by a good half-pound. But the Z835 also looks and feels the cheapest of the bunch. Its construction seems less solid—particularly the lid, which has a disconcerting amount of flex.

The Z835's dark-gray and black color scheme is peppered with chrome accents that look a bit dated. All the keys on the Z835's island keyboard are normal width, but they are also slightly squat, which takes getting used to, as does the shallow travel of all keyboards of this ilk. The keyboard's backlighting is a surprising feature at this price—and not one currently found on the more expensive Ultrabook models. A traditional touchpad of decent size with discrete right and left buttons stands out among the other Ultrabooks' clickpads.

The Z835's hardware specs are another reflection of its low price. The centerpiece is a 1.4GHz Core i3-2367M, which doesn't benefit from any Turbo boost whatsoever. This renders the Z835 the slowest in the benchmarks of all four Ultrabooks, and even slower than our elderly zero-point, except in Quake 4, thanks to Sandy Bridge graphics.

The Z835 also skimps on storage capacity, offering just 128GB. It's full-SSD, but that's not saying much. The Toshiba NAND flash coupled with a Toshiba controller mustered just 187MB/s sequential reads in CrystalDiskMark—half the speed and then some of the other two SSDs in this roundup. More pathetic still, the Z835's sequential write speed of 49.23 is 40 percent slower than that of the HDD in Acer's S3.

On the brighter side, the Z835 offers the most generous array of ports, with full-size VGA in addition to full-size HDMI, two USB 2.0 ports plus one USB 3.0, and an Ethernet port—a rarity in this roundup.

The Z835's glossy 1366x768 screen isn't spectacular, but it reproduced pictures and videos without noticeable flaws and the viewing angle is thankfully wider than that of the Acer S3. In our battery rundown test, the Z835 played a continuously looping video for close to five hours. It took about three hours to completely recharge. It booted to Windows in 24 seconds, which isn't bad.

Even more so than Acer's S3, the Z835 deserves credit for offering such a svelte and exceedingly portable form factor for its price. But reaching that price entailed compromises—a few too many, in our opinion, to grant this product more than a mild endorsement.

VERDICT 6

Toshiba Portégé Z835

➕ **SLIM SHADY** Very slim and lightweight for the price; lots of ports.

➖ **SLIM PICKINGS** Too underpowered; sorry SSD speeds; flimsy lid.

$800, www.toshiba.com

BENCHMARKS

	ZERO POINT	
Premiere Pro CS3 (sec)	1,260	1,620 (-22.2%)
Photoshop CS3 (sec)	183.6	220.5 (-16.7%)
ProShow Producer (sec)	1,533	2,075 (-26.1%)
MainConcept (sec)	2,530	3,660 (-30.9%)
Quake III (FPS)	191.7	159.3 (-16.29%)
Quake 4 (FPS)	17	38.4 (125.9%)
Battery life (min)	240	297

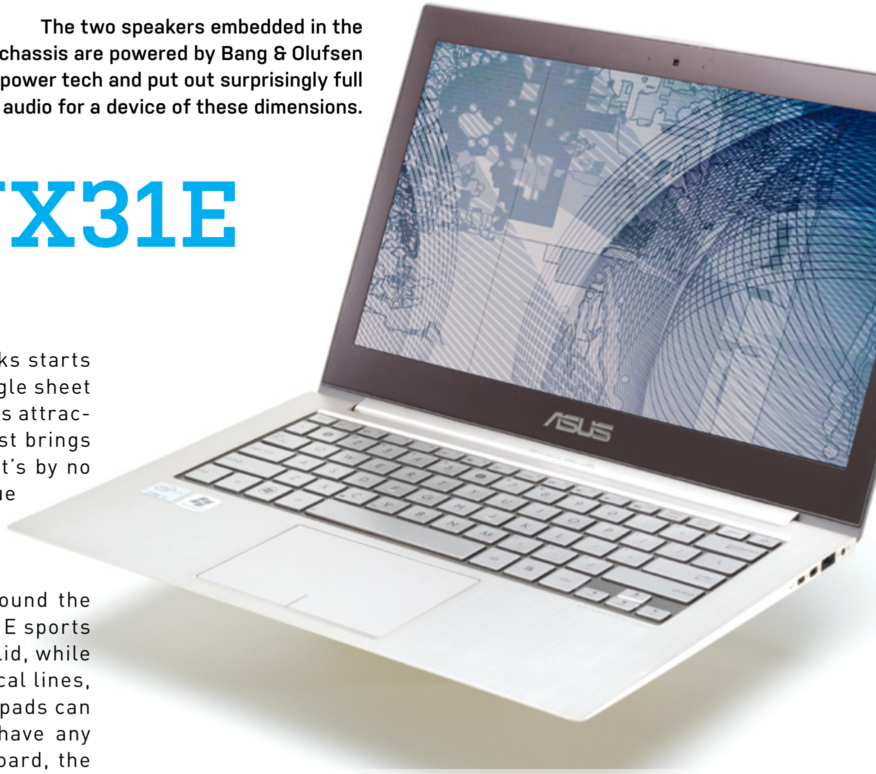
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Our zero-point ultraportable is an HP EliteBook 2540p with a 2.13GHz Intel Core i7-640LM, 4GB of DDR3/1333 RAM, integrated graphics, a 250GB 5,400rpm hard drive, and Windows 7 Professional 64-bit.

SPECIFICATIONS

CPU	1.4GHz Intel Core i3-2367M
RAM	4GB DDR3/1333
Chipset	Intel HM65
Display	13.3-inch, 1366x768
Storage	Toshiba 128GB SSD
Connectivity	1 USB 3.0, 2 USB 2.0, Ethernet, HDMI, VGA, headphone, mic, media reader, webcam, Bluetooth, Wi-Fi
Lap / Carry	2 lbs, 6.6 oz / 3 lbs, 1.2 oz

The two speakers embedded in the chassis are powered by Bang & Olufsen ICEpower tech and put out surprisingly full audio for a device of these dimensions.



ASUS ZENBOOK UX31E

Now we're talking turkey

WITH THE ASUS UX31E, all the fuss about Ultrabooks starts to make sense. Its all-metal chassis, cut from a single sheet of aluminum, is undeniably handsome. And while this attractive metal wedge that's just .71 inches at its thickest brings to mind the fine craftsmanship of a MacBook Air, it's by no means a knockoff. The UX31E possesses a unique character that's admirable in its own right. And at $1,050, it's $250 less than its similarly spec'd Apple counterpart.

Silver inside and out, save for a black bezel around the screen and black backing to the keyboard, the UX31E sports a faintly etched pattern of concentric circles on its lid, while the deck is adorned with a pattern of brushed vertical lines, interrupted only by a spacious clickpad. While clickpads can be persnickety and frustrating to use, we didn't have any issues with the pad on the UX31E. As for the keyboard, the size and spacing of the keys feels right, and although the key press is shallow, there's a satisfying click at the end of each depression.

Another welcome feature of the UX31E is its 1600x900 screen resolution, besting the 1366x768 of the other screens in this roundup and the 1440x900 of the 13.3-inch MacBook Air. Like all the others, the UX31E's screen is glossy; it produces a bright, vivid picture and holds up well off axis.

Internally, the UX31E also impresses. Its Core i5-2557M proc is clocked at 1.7GHz, with a max Turbo frequency of 2.7GHz. Combine that with a SATA 6Gb/s SSD and you've got a machine that posts healthy gains over our zero-point in the benchmarks and some of the fastest scores in this roundup. To put it in perspective, the UX31E had sequential read and write speeds of 463MB/s and 341MB/s, respectively—pretty darn close to the spec's max bandwidth. Sadly, the SSD is just 128GB.

The UX31E's battery life surpassed five hours in our tests. It recharged to 50 percent in less than an hour, and reached a full charge in three. Booting to Windows took 23 seconds.

Asus throws in a tasteful, brown padded carrying case for the UX31E, as well as a matching pouch that holds two connector dongles: USB-to-Ethernet and Mini VGA-to-VGA. Yes, Mini VGA is built into the unit (who knew it even existed?), along with Mini HDMI, USB 2.0, USB 3.0, headphone, mic, and a media reader.

All told, the UX31E weighs in at three pounds, 2.1 ounces (or 8.3 ounces, if you add the power supply). If going toe-to-toe with Apple's Air on both design and specs, while beating its price, is what it takes to achieve product hotness, then Asus has done it.

VERDICT 9 KICK ASS!

Asus Zenbook UX31E

+ HOTTY Stunning design; strong performance; SATA 6Gb/s SSD.

− HAUGHTY 128GB storage and no way to upgrade it.

$1,050, www.asus.com

BENCHMARKS

	ZERO POINT	
Premiere Pro CS3 (sec)	1,260	1,080
Photoshop CS3 (sec)	183.6	168.3
ProShow Producer (sec)	1,533	1,347
MainConcept (sec)	2,530	2,354
Quake III (FPS)	191.7	217.3
Quake 4 (FPS)	17	46.6 (174.1%)
Battery life (min)	240	310.0

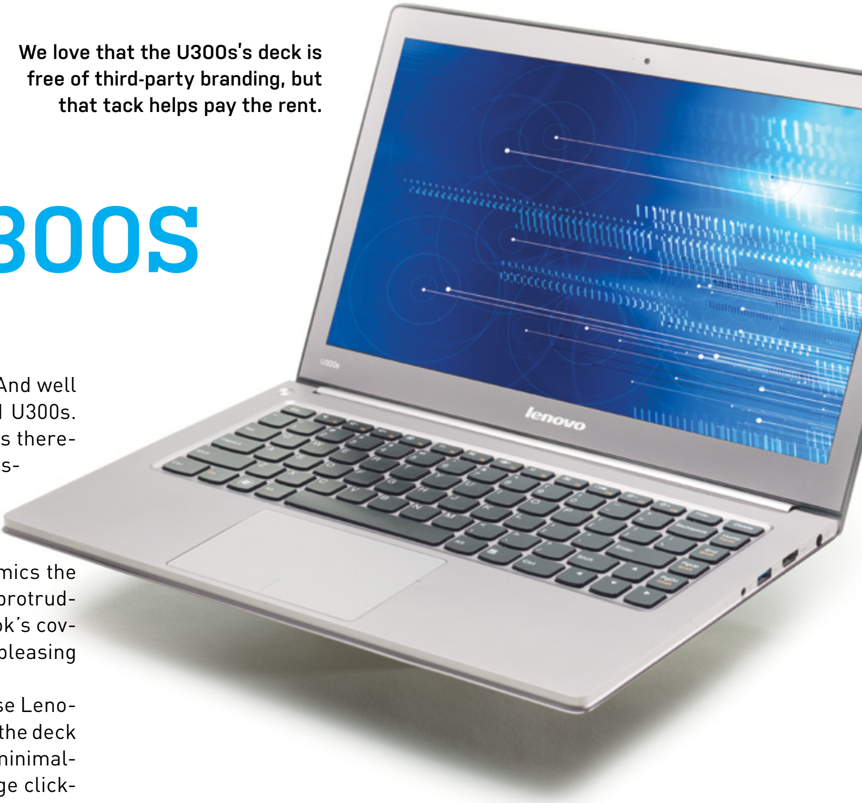
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Our zero-point ultraportable is an HP EliteBook 2540p with a 2.13GHz Intel Core i7-640LM, 4GB of DDR3/1333 RAM, integrated graphics, a 250GB 5,400rpm hard drive, and Windows 7 Professional 64-bit.

SPECIFICATIONS

CPU	1.7GHz Intel Core i5-2557M
RAM	4GB DDR3/1333
Chipset	Intel QS67
Display	13.3-inch, LED backlit@1600x900
Storage	SanDisk U100 128GB SSD
Connectivity	1 USB 2.0, 1 USB 3.0, Mini VGA, Mini HDMI, headphone, mic, webcam, Bluetooth, Wi-Fi
Lap / Carry	3 lbs, 2.1 oz / 3 lbs, 8.3 oz

We love that the U300s's deck is free of third-party branding, but that tack helps pay the rent.



LENOVO IDEAPAD U300S

Hits all the right notes except price

LENOVO ALSO BRINGS its A-game to the Ultrabook party. And well it should, since it's asking almost $1,500 for the IdeaPad U300s. That's premium, business-ultraportable price territory. It's therefore apropos that the U300s has the most businessy aesthetic, although not at the sake of sleek design. Like the Asus UX31E and the MacBook Air, the U300s is crafted from a single-sheet of aluminum. It eschews the wedge form factor established by Apple and instead uniquely mimics the lines of a hardbound book, with the top and bottom edges protruding slightly all the way around the perimeter, the way a book's covers protrude past the pages. It makes for a distinct and pleasing silhouette.

Both bottom and top are dark gray—Graphite Gray, to use Lenovo's parlance (Clementine Orange is also an option)—while the deck and screen bezel are matte silver. The inside is clean and minimalist, consisting of a power button, island keyboard, and large clickpad. The Shift, Enter, Caps, Tab, and Backspace keys are all slightly shortened, but typing on the U300s was a mostly comfortable, trouble-free affair, and the glass-surfaced clickpad is sublime.

Ports include one USB 3.0, one USB 2.0, full-size HDMI, and a headphone/mic combo. Lenovo is alone in this pack for excluding a media reader. A small button on the notebook's left side launches Lenovo's OneKey Recovery, which walks you through creating a system image that can be launched from the same button should your system fail. The U300s also supports Intel's Wireless Display technology. So with a WiDi adapter (purchased separately) attached to your TV, you can stream any content from your notebook via Intel's software.

Enough with the extras, how 'bout the hard stuff? The U300s is powered by a Core i7-2677M, which is clocked just a hair above the Core i5 in the Asus UX31E, at 1.8GHz. The two units traded wins in the benchmarks, although the U300s performed significantly better than the UX31E in Photoshop, for inexplicable reasons. In Quake III, the U300s suffered the fate of all single-channel RAM configs. For storage, Lenovo taps a comparatively spacious 256GB SSD. It's a SATA 3Gb/s device using a year-old J Micron controller, but it comes close to maximum bandwidth, and subjectively speaking, the U300s feels plenty snappy. It was the quickest to boot to Windows, posting 17 seconds flat.

The U300s's screen quality is on par with the UX31E's, albeit at a lower res of 1366x768. Battery life for the two was also similar, exceeding five hours. Lenovo, however, had the speediest recharge, hitting 50 percent in 30 minutes.

So, yes, the U300s offers a good deal of quality for the price. But it's nonetheless costly, and by contrast, the Asus UX31E is the better Ultrabook value.

VERDICT 8

Lenovo IdeaPad U300s

+ ULTRABOOK Attractive design; high quality; Core i7 and 256GB SSD.

− ULTRABROKE Expensive; no media reader; lower-res screen than UX31E.

$1,495, www.lenovo.com

BENCHMARKS

	ZERO POINT	
Premiere Pro CS3 (sec)	1,260	1,140
Photoshop CS3 (sec)	183.6	111
ProShow Producer (sec)	1,533	1,396
MainConcept (sec)	2,530	2,259
Quake III (FPS)	191.7	185.3 (-3.3%)
Quake 4 (FPS)	17	41.9 (146.5%)
Battery life (min)	240	310.0

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

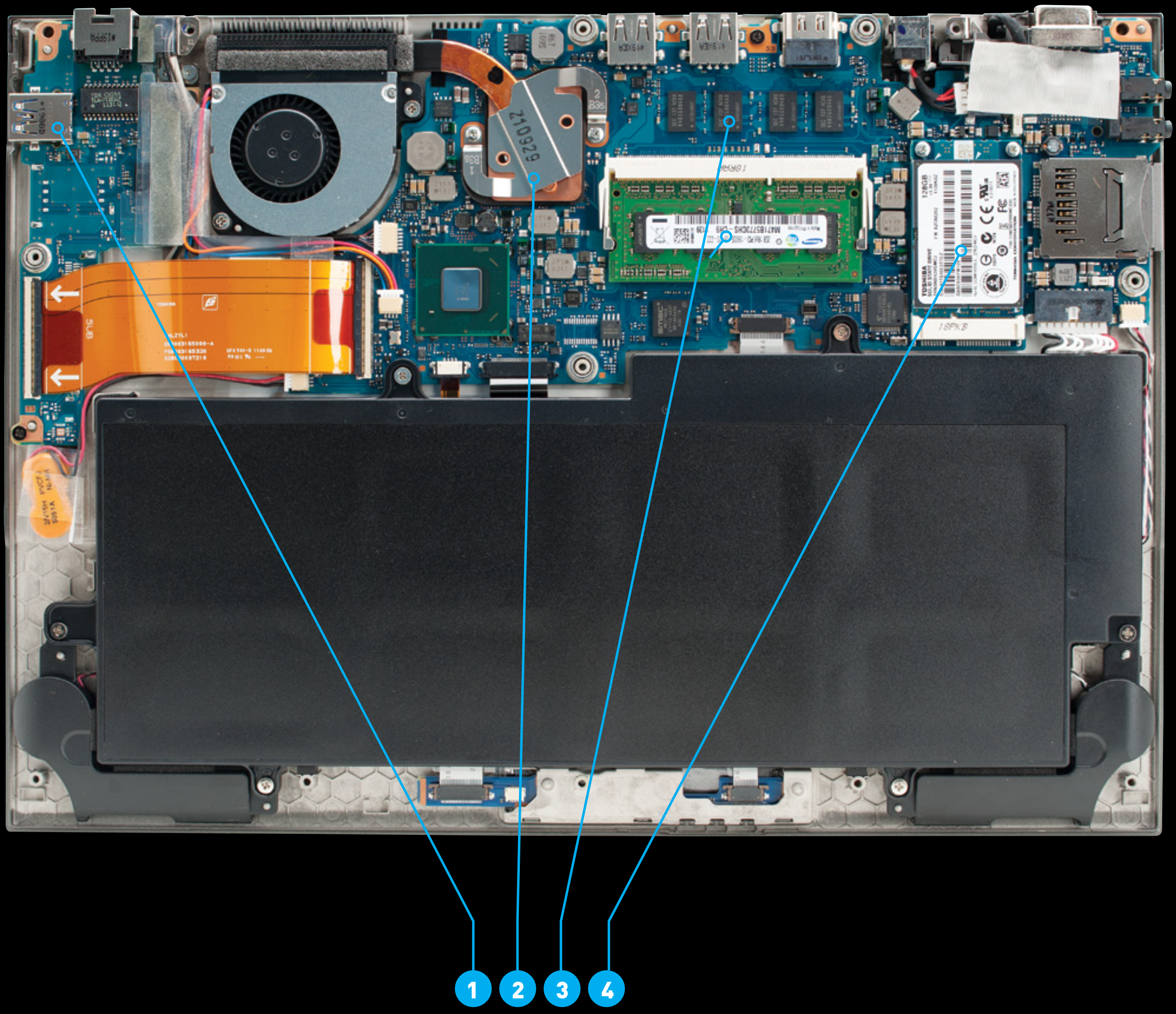
Our zero-point ultraportable is an HP EliteBook 2540p with a 2.13GHz Intel Core i7-640LM, 4GB of DDR3/1333 RAM, integrated graphics, a 250GB 5,400rpm hard drive, and Windows 7 Professional 64-bit.

SPECIFICATIONS

CPU	1.8GHz Intel Core i7-2677M
RAM	4GB DDR3/1333
Chipset	Intel QS67
Display	13.3-inch, 1366x768
Storage	256GB SSD
Connectivity	1 USB 2.0, 1 USB 3.0, HDMI, headphone/mic, webcam, Bluetooth, Wi-Fi
Lap / Carry	2 lbs, 14.7 oz / 3 lbs, 8.4 oz

INSIDE OUT: ANATOMY OF AN ULTRABOOK

On the whole, Ultrabooks aren't the most upgrade-friendly devices. Of the four we reviewed, only the Asus and the Toshiba models seem to grant interior access that doesn't entail potential damage to the machine—and even those devices each require the removal of 12 screws, plus the use of a tiny security bit, in the case of the Toshiba. Here's what Toshiba's Z835 packs under the hood.



USB 3.0: Like most of the Ultrabooks here, the Z835 features USB 3.0. It comes compliments of an NEC controller.

CPU: To save space, the Z835's Core i3-2367 uses a ball-grid array, soldered to the board, rather than a higher-profile socket. That negates a future CPU upgrade.

RAM: The memory configuration is interesting, consisting of a 2GB SO-DIMM that can easily be upgraded, as well as 2GB of memory soldered to the board.

SSD: A standard mSATA drive allows a future swap out—a nice consolation since the 128GB Toshiba drive that comes with the Z835 is small, as well as slow by SSD standards.

THE UPSHOT ON ULTRABOOKS

Where do they stand in the 'must-have' product universe?

Now that we've seen what Ultrabooks have to offer, we can fairly say the category has promise. Intel's success with Sandy Bridge, its strong desire to keep the ARM crowd at bay, and its deep pockets have spurred impressive strides in device development—shoot, two months ago, we couldn't have imagined an ultraportable as capable and attractive as Asus's UX31E fetching anything less than $1,400. To see a first-gen product of that caliber hovering just above a grand says something.

Are Ultrabooks ready to overtake tablets? Probably not—right now. Granted, even the current crop's mix of stylishness, generous battery life, fast boots, and real PC performance will give some tablet shoppers pause when weighing the pros and cons of each device class. But the prices of Ultrabooks are still a little high (particularly for the more lust-worthy models) to compete with $200-$500 tabbies.

And then there's that little matter of touch. For the time being, Ultrabooks don't come with touchscreens—a primary factor in tablets' appeal. Nor do Ultrabooks hook into an app marketplace. Expect those things to change with the release of Windows 8 in 2012. Win8's Metro UI will not only look the part of a mobile OS, but also be optimized for touch, and rumor has it the OS will include an integrated app store.

Yes, a touchscreen has the potential to add to an Ultrabook's cost, but Intel is already working on that. At the Intel Capital Global Summit in November, CEO Paul Otellini made it clear that touch-based Ultrabooks will be a big focus for the company in 2012. Part of that includes getting the cost of touch down. Intel's $300 million Ultrabook fund will help with that. Ultimately, Otellini wants to see Windows 8 touch-based Ultrabooks starting at $699.

> PAUL OTELLINI WANTS TO SEE WINDOWS 8 TOUCH-BASED ULTRABOOKS STARTING AT $699 IN 2012

Ivy Bridge will also figure prominently in Ultrabooks' future. Intel's next CPU will be manufactured on a 22nm tri-gate process, making it more power efficient than Sandy Bridge chips, and it will feature an entirely new graphics core that's reportedly going to offer 50 percent better performance than Sandy Bridge in 3D games and feature DirectX 11 support, to boot.

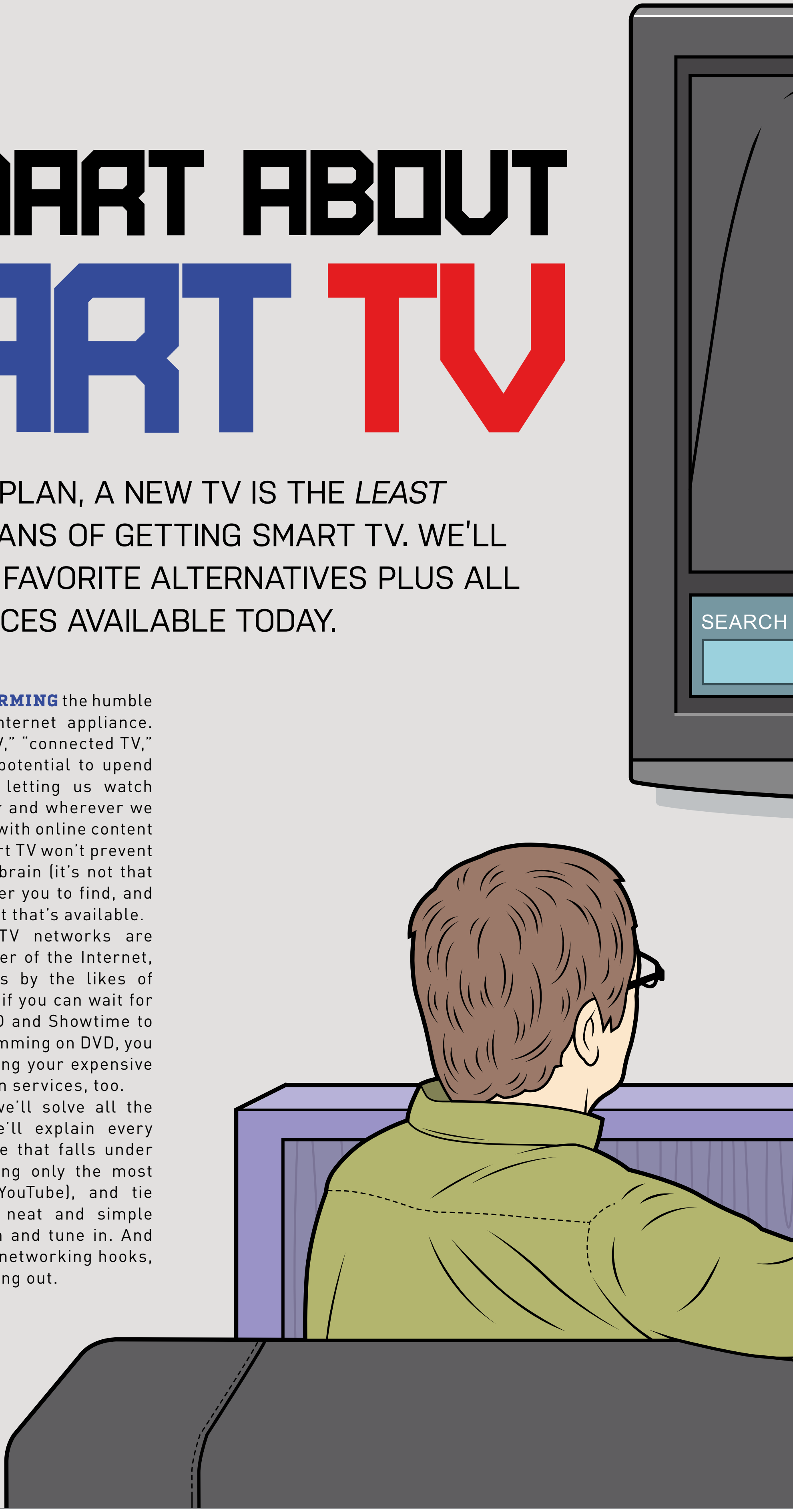
All told, there's potential here for these devices to be tablet killers—if value and functionality mean anything. For now, though, Ultrabooks should at least make portable-PC shoppers happy. All the models we reviewed here represent a big shift in the laptop landscape, from design, to form factor, to price. Yes, Asus's UX31E offers the most compelling mix of all these factors, but we believe that Ultrabooks as a whole have serious merit as ultraportable general-purpose PCs.

ULTRABOOK PERFORMANCE COMPARISON

	ACER S3	Toshiba Z835	Asus UX31E	Lenovo U300s
Premiere Pro (sec)	1,200	1,620	**1,080**	1,140
Photoshop (sec)	162.5	220.5	168.3	**111**
ProShow Producer (sec)	1,497	2,075	**1,347**	1,396
MainConcept (sec)	2,591	3,660	2,354	**2,259**
CrystalDiskMark				
Seq. read	85.33	187	**462.5**	248
Seq. write	83.95	49.23	**341.4**	187.3
Quake III (fps)	168.8	159.3	**217.3**	185.3
Quake 4 (fps)	38.5	38.4	**46.6**	41.9
Battery life (min)	252	297	310	**312**

GET SMART ABOUT SMART TV

IN OUR LESSON PLAN, A NEW TV IS THE *LEAST* ATTRACTIVE MEANS OF GETTING SMART TV. WE'LL SHOW YOU OUR FAVORITE ALTERNATIVES PLUS ALL THE BEST SERVICES AVAILABLE TODAY.

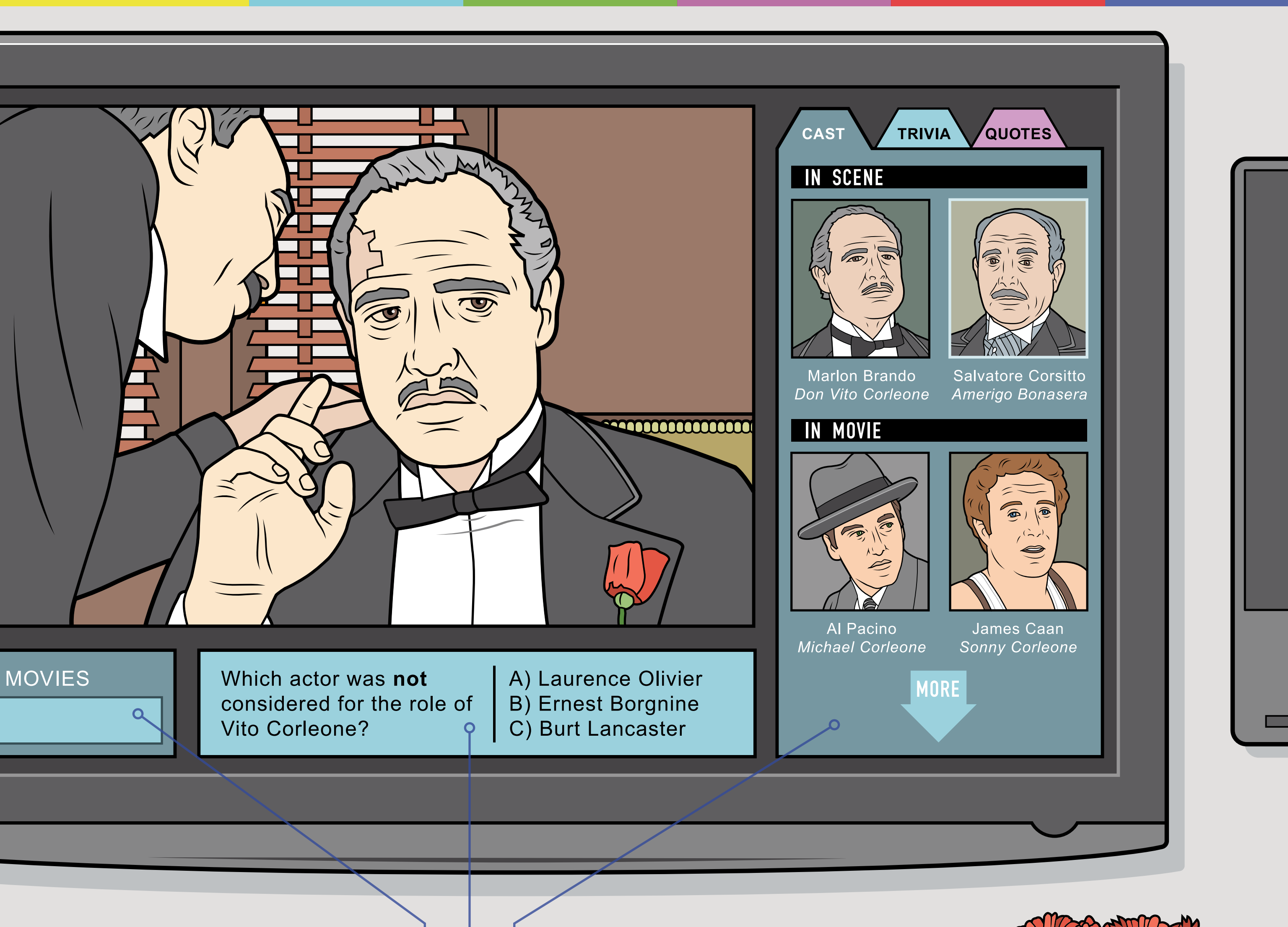


TECHNOLOGY IS TRANSFORMING the humble idiot box into a powerful Internet appliance. Whether you call it "smart TV," "connected TV," or "Internet TV," it has the potential to upend our boob tube experience, letting us watch our favorite shows whenever and wherever we want, and merging TV shows with online content in cunning, clever ways. Smart TV won't prevent television from rotting your brain (it's not that smart), but it should empower you to find, and get more from, all the content that's available.

Hollywood studios and TV networks are finally waking up to the power of the Internet, thanks to pioneering efforts by the likes of Netflix, Hulu, and Vudu. And if you can wait for pay-TV services such as HBO and Showtime to release their original programming on DVD, you can seriously consider ditching your expensive cable or satellite subscription services, too.

In the following pages, we'll solve all the mysteries of smart TV. We'll explain every important service and device that falls under the smart TV rubric (omitting only the most obvious players, such as YouTube), and tie everything together into a neat and simple package. It's time to turn on and tune in. And with all of smart TV's social-networking hooks, you definitely won't be dropping out.

BY MICHAEL BROWN



SMART TV: A VISION OF THE FUTURE

1. Press a button, and your smart TV interface could bring up online search—with no interruption to whatever content you're watching.

2. Classic films could spawn interactive trivia games that sync with scenes and bits of dialogue as they appear in real time.

3. Facial recognition technology could identify the actors appearing in the scene you're watching, providing bios of cast members as they appear on screen.

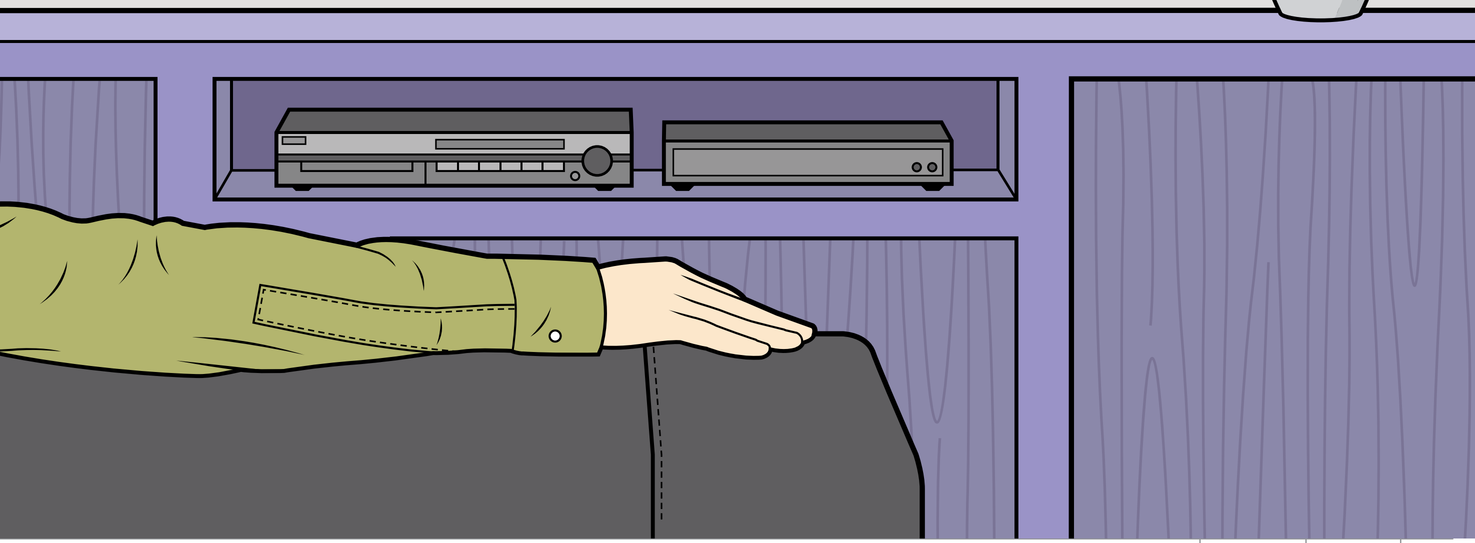


ILLUSTRATION BY TIMMY KUCYNDA

ONLINE MOVIE & TV SERVICES

The Internet has exploded the video-on-demand market, wiping out the cable and satellite companies' monopoly on which shows are available and when. Sure, the websites of the major TV networks let you watch full episodes of their shows (with varying levels of episode availability, advertising, and video quality), but the services in this section add movies to the mix, and generally improve TV video quality and grant access to greater storehouses of content. If you're looking to cut your monthly bills, here are all the ways you can watch the latest movies and TV shows without a Comcast or DirecTV in your life.

AMAZON INSTANT VIDEO

WHAT IS IT?

Amazon.com's online VOD store lets you rent or purchase TV shows and Hollywood movies. Most rented videos are streamed, although some can be fully downloaded to a TiVo DVR or to Amazon's Unbox Video Player on a Windows PC. You can also purchase videos on one computer and download them to another, stream videos from your PC to an Xbox 360, or stream them from the web to Amazon's new Kindle Fire. Amazon will store your purchased videos on its servers, too.

WHAT'S AVAILABLE?

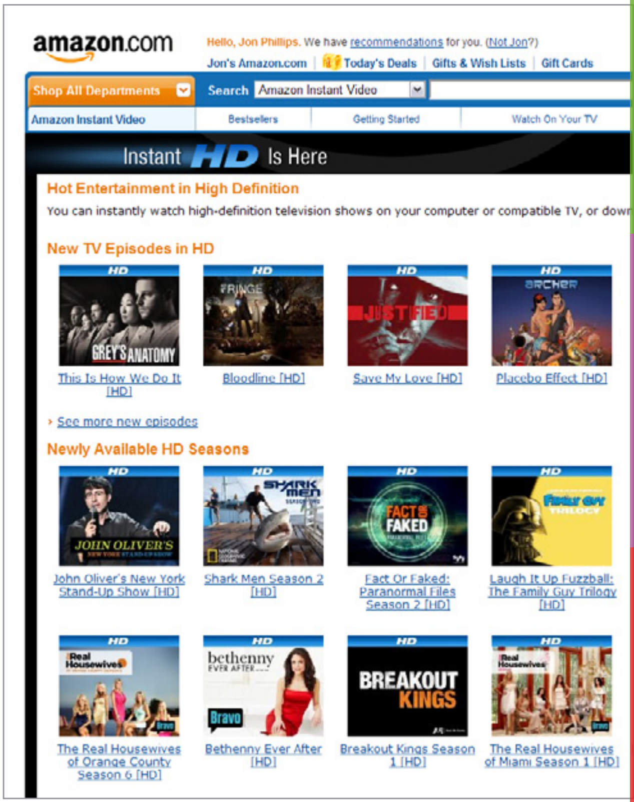
Amazon claims 90,000 titles in its library. You'll find Hollywood movies (available as soon as they hit DVD), as well as TV shows from the broadcast and cable networks, including Showtime and HBO (although you'll have to wait a while for HBO's programs to show up). Videos are streamed at the highest resolution your Internet connection supports, up to a maximum of 720p with a 3.5Mb/s connection. The minimum supported speed is 450Kb/s.

DEVICES WITH SUPPORT BUILT IN

Various TVs from Panasonic, Samsung, Sony, and Vizio; various Blu-ray players from Panasonic and Sony; TiVo DVRs (downloads only, streaming is not supported); Roku media players; Google TV devices; Windows PCs; and the Kindle Fire.

PRICING

Newly released movies typically cost $3.99 to rent and $14.99 to purchase. Sale prices for older movies typically drop to $9.99 (rental prices remain the same), while some classics can be purchased for $4.99 or less, or rented for $2.99. TV shows are typically sold for $1.99 per episode (with discounts if you purchase entire seasons), but most HBO shows are available only for rental. Amazon doesn't charge a monthly fee, although subscribers to the company's Amazon Prime program ($79 per year) can stream (but not download) an unlimited number of movies and videos from a library of about 10,000 titles and TV episodes.



OUR TAKE

Amazon offers great prices if you're interested in buying downloadable movies, and the option to store your purchases on its servers reduces your risk should you suffer an equipment failure at home. The ability to transfer rented movies to portable devices would be a great differentiator if the list of supported devices included anything relevant. Free video rentals is a great new benefit if you're already an Amazon Prime subscriber, but Amazon's library is too small to justify signing up for that service solely to get free video streaming.

BLOCKBUSTER ON DEMAND

WHAT IS IT?

Blockbuster, now owned by Dish Network, offers two online services. Blockbuster on Demand offers streaming VOD rentals and movie downloads for purchase. Dish Network subscribers can opt for Blockbuster Movie Pass, which includes video rentals streamed to a Dish set-top box, plus DVD and Blu-ray disc rentals by mail (limited to one disc being out at any one time).

WHAT'S AVAILABLE?

You'll find VOD versions of movies just released to DVD, as well as a deep library of classic films available in resolutions up to 1080i. The service doesn't currently offer any TV shows for rental or purchase, but Blockbuster Movie Pass does include Starz programming (which consists of some original series and mini-series, plus movies that have already had their run on premium pay-TV channels such as HBO and Showtime).

DEVICES WITH SUPPORT BUILT IN

Various TVs from Samsung and Vizio; various Blu-ray players from Onkyo, Philips, Samsung, and others; TiVo DVRs; select smartphones and tablets on the AT&T, Sprint, T-Mobile, and Verizon networks; networked media players from Western Digital and 2Wire; and Windows PCs.

PRICING

Most new releases cost $3.99 to rent, or $19.99 to $21.99 to purchase. You can rent some older movies for as little as $1.99, but the service isn't competitive when it comes to selling most classics, with titles typically priced at $9.99 each. There is no subscription fee for Blockbuster on Demand. Blockbuster Movie Pass costs $10 per month in addition to your Dish Network subscription.

OUR TAKE

Blockbuster on Demand isn't any more or less compelling than any of the other movie-rental services covered here, unless you want to watch movies and TV shows on your handheld device (note, however, that iOS devices—including the iPad—are *not* supported). If you're already a Dish Network subscriber, on the other hand, Blockbuster Movie Pass is a solid value at $10 per month, especially since Dish doesn't charge extra to rent movies on Blu-ray disc (take that, Netflix!).

CINEMANOW

WHAT IS IT?

Operated by Best Buy and powered by RoxioNow, CinemaNow is another VOD service that offers movies and TV episodes for rental or purchase. Regardless of whether you rent or buy, videos can be streamed for instant viewing, or downloaded and watched later (downloads can be shared between five devices). You can also use your smartphone to purchase content and have it downloaded to your Windows PC. This way, you can purchase a movie while you're at work, and it will be ready to watch when you get home.

WHAT'S AVAILABLE?

You'll find VOD versions of movies just released on disc, as well as a spotty selection of TV shows from the broadcast and cable networks, including Showtime, but not HBO. New TV episodes—of the select shows actually offered—are generally available the day after they're broadcast. Videos are streamed at the highest resolution (up to 1080p) that your Internet connection is capable of supporting. CinemaNow requires a minimum connection speed of 1.5Mb/s.

DEVICES WITH SUPPORT BUILT IN

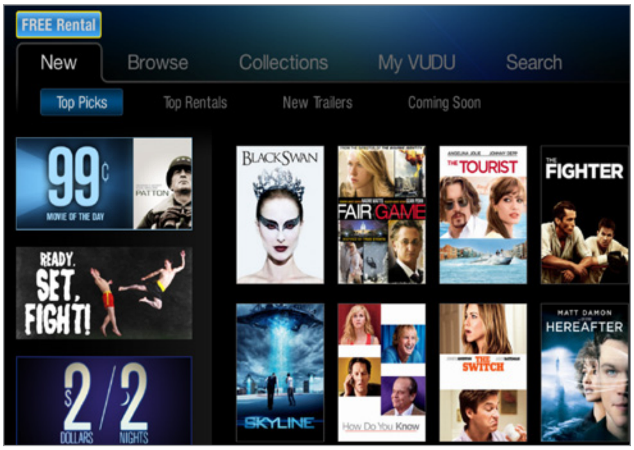
Various TVs from LG and Samsung; various Blu-ray players from Insignia (Best Buy's house brand), LG, Panasonic, and Samsung; Microsoft Xbox 360 gaming console (requires Windows PC connection); Mac or Windows PC (via browser).

PRICING

Most newly released movies can be rented for $3.99, while older movies rent for $2.99. Purchase prices for films range from $9.99 to $19.95, although most new releases were selling for $15.95 at press time. TV episodes sell for $1.99 each. There are no subscription fees.

OUR TAKE

Best Buy offers very good prices for movie purchases, but its prices for movie rentals and TV episode purchases are just meh. We like the ability to buy a movie with a smartphone and have it automatically downloaded to a PC—and it would be great if rentals could be arranged this way, too. For whatever reason, Best Buy has chosen to support far fewer devices than the RoxioNow service is capable of delivering (see Blockbuster on Demand for examples).



CRACKLE

WHAT IS IT?

Crackle describes itself as a multiplatform video entertainment network and studio owned by Sony Pictures Entertainment. The service is unique in that it allows you to embed its original programming, "minisodes," full-length television episodes, and feature films.

WHAT'S AVAILABLE?

You'll find full-length feature films and TV episodes, as well as trailers for coming attractions. Sony owns most of this content, including some entirely original programming. Oddly enough, videos default to 360p resolution, which is lower than standard definition (480p). Crackle offers some content at higher resolution, but it tops out at—you guessed it—480p.

DEVICES WITH SUPPORT BUILT IN

You can stream—but not download—Crackle's Flash videos to these connected devices: Sony's Bravia TVs; Sony's Internet TV; most Sony Blu-ray players; TiVo DVRs; Sezmi set-top box; Google TV devices, such as the Logitech Revue; Hulu (and all networked media players that support that service); D-Link's Boxee Box; Roku devices; the Sony PlayStation 3; Verizon FiOS TV; Android devices; mobile devices on the Sprint, T-Mobile, and Verizon networks; Apple's iPad, iPhone, and iPod Touch; Windows PCs.

PRICING

Crackle is entirely free, but it is heavily supported by online ads and commercial interruptions. You must be at least 18 years old and register with the site to access R-rated movies.

OUR TAKE

If you're a Netflix subscriber, you've probably already seen most of the movies that Crackle has to offer—and without commercial interruptions. The low-res video is another bummer. Some of Crackle's original content is definitely worth watching, though, especially the female-assassin series *Angel of Death*. Crackle is a good choice if you enjoy watching videos on your mobile device, too; and it's one of the few services to support the iPad. While we applaud Crackle for enabling its customers to distribute its content relatively freely (through embedding), bear in mind that it's primarily in the interest of promoting the service.

VUDU

WHAT IS IT?

Vudu started life as a movie-download service using a proprietary box with a hard drive. Besides the hardware—and a bevy of deals with movie studios—Vudu's biggest claim to fame was its HDX video-encoding algorithm that enabled it to stream movies in full 1080p resolution. The set-top box eventually fell by the wayside in favor of streaming movies to devices such as Blu-ray players. That removed a significant barrier for consumers, but it wasn't enough to keep the company independent—it was acquired by WalMart in early 2010.

WHAT'S AVAILABLE?

Vudu offers Hollywood movies (and Showtime TV episodes) for rental and sale, typically the same day they become available on disc. Videos are streamed at the highest resolution your Internet connection can support, with standard-definition (480p) video requiring a minimum download speed of 1–2Mb/s. Vudu offers two high-definition streams: HD (720p), which requires a minimum download speed of 2.25–4.5Mb/s, and HDX (1080p with Dolby Digital Plus 7.1-channel sound), which requires a very fat pipe that can deliver between 4.5- and 9Mb/s. This is also the only service that supports 3D video streaming.

DEVICES WITH SUPPORT BUILT IN

Most newer Blu-ray players, HDTVs, and home-theater-in-a-box sytems; a number of networked media players, including D-Link's Boxee Box, Netgear's NeoTV, and Roku devices; Sony's PlayStation 3; Apple's iPad; and Windows PCs.

PRICING

New releases cost $3.99, $4.99, or $5.99 to rent (for SD, HD, and HDX, respectively). Vudu sells most new releases for $14.99 (in SD) or $19.99 (in HD or HDX). Older movies rent for $2 for two nights, with a limited number of movies renting for just 99 cents.

OUR TAKE

Who'd have guessed that WalMart would come to offer one of the best online video-rental services on the market? Vudu is at least as good as Amazon Instant Video, and it supports far more hardware platforms than iTunes; Netflix' movie offerings are downright stagnant in comparison. If WalMart wants to make the service even more compelling—and more profitable—it should enable customers without super-fast broadband connections to download movie rentals in HDX (like the original Vudu box did).

HULU & HULU PLUS

WHAT IS IT?

Hulu is a content aggregator offering on-demand TV shows and movies from most of the major networks and movie studios. Hulu is the name of the free service, while Hulu Plus offers more features and is subscription based. Major players that own stakes in Hulu include NBC Universal (now merged with Comcast), News Corporation (owner of the Fox network), and Walt Disney Corporation (owner of ABC). CBS (which also owns Showtime and more) is the only major TV network that doesn't own a piece of Hulu.

WHAT'S AVAILABLE?

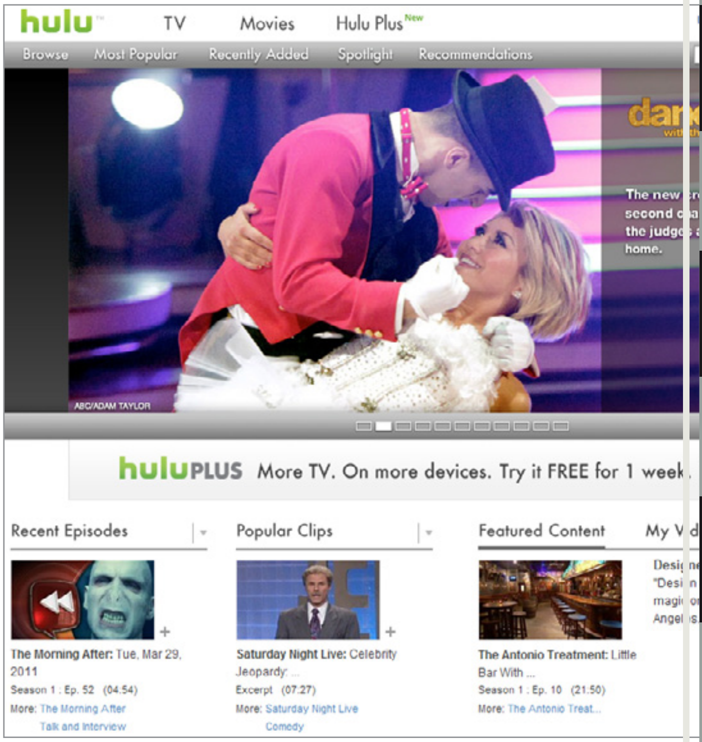
Most of Hulu's content consists of TV episodes, news programming, and a handful of feature films produced by the three major concerns with ownership stakes. TV shows typically appear the day after they're broadcast, and all this content is supported by advertisements, even if you spring for a Hulu Plus subscription.

So what do you get if you subscribe? Higher-resolution video, for starters. Hulu content is streamed in "standard definition" (a term Hulu doesn't define), while Hulu Plus video streams in "high definition" (720p). And while basic Hulu is available only on a computer, Hulu Plus can be streamed to an increasingly wide range of devices. Also, basic Hulu delivers only the five most recent episodes of available TV series, whereas you get entire seasons on Hulu Plus.

Movies generally aren't one of Hulu's strengths, but cineastes will revel in the Criterion Collection of films available on Hulu Plus. Criterion is renowned for both the impeccable quality of its film-to-video digital transfers and its supplemental material, including deleted scenes, audio commentaries, and more. This supplemental material isn't currently available on Hulu Plus, but it's slated to be included in the future.

DEVICES WITH SUPPORT BUILT IN

Hulu is available on Windows PCs, but you must be connected to the Internet to watch, and you can't download and store videos on your machine. Hulu Plus has the same restrictions, but can be streamed to a variety of TVs from Samsung, Sony, and Vizio; various Blu-ray players from Samsung, Sony, and Vizio; TiVo Premiere DVRs; Android smartphones and tablets; networked media players, Roku and Western Digital networked media players; Sony's Dash and Netbox; Sony's PlayStation 3, Nintendo's Wii, and Microsoft's Xbox 360; iOS devices; and—coming soon—Nintendo's 3DS handheld gaming system.



PRICING

Hulu is free. Hulu Plus costs $7.99 monthly. Videos on both services contain commercial advertising, and you'll need to register for whichever service you decide to use.

OUR TAKE

We loathe commercials, but they're a reasonable trade-off for getting triple-A content for free. But having to pay for content and still be forced to watch commercials is something else. Hulu's free iteration delivers most of what you'll get on broadcast and subscription TV, so it could well satisfy your needs—provided you don't mind watching standard-def video on a computer and don't fall too far behind in a TV series season.

Hulu Plus offers a lot more content, and it's available on a host of devices that will connect directly to your TV. If you're looking to cut your ties to a pay TV service, it's definitely worth $7.99 per month—even with the commercials. Aside from the excellent Criterion Collection, however, Hulu Plus can't compete with the Netflix movie library.

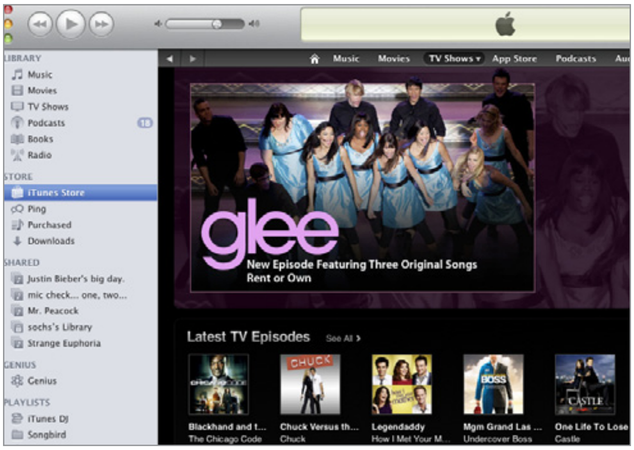
SMART TV HARDWARE ESSENTIALS

HERE'S EVERYTHING YOU'LL NEED TO INDULGE YOUR INTEREST IN SMART TV. SURPRISE! IT'S NOT REALLY ALL THAT MUCH

BROADBAND INTERNET ACCESS: Dial-up access isn't going to cut it. City and suburb dwellers should look into cable modems and DSL. Folks living in rural areas where those services aren't available should check into wireless solutions, such as WiMax. Satellite service is another alternative, although it's relatively slow and can be very expensive.

A DISPLAY: You don't necessarily need a TV to get smart TV; you can just as easily use the display connected to your desktop or notebook computer. TVs, on the other hand, typically offer bigger screens, and you can connect your existing unit to whichever smart TV hardware you're using to pull content from the Internet. Newer TVs make all this easier, thanks to their built-in apps and Ethernet support.

A NETWORKED MEDIA PLAYER: If you don't have a TV with built-in smart TV apps, you'll need something from this category, which includes devices such as Western Digital's WD TV Live, Netgear's Neo TV, D-Link's Boxee Box, or one of the Roku devices. Most Blu-ray players and home-theater-in-a-box systems include smart TV apps, too. The best solution, of course, is to buy a PC that can be incorporated into your home entertainment system.



ITUNES STORE

WHAT IS IT?

Available for both Mac and PC, Apple's free iTunes application lets you play, organize, and purchase digital music and video. You can also use iTunes to transfer your video purchases to an iPod, iPad, or iPhone, or stream that content to all these devices, as well as to the Apple TV media player. Whereas iTunes music downloads can only be purchased, movies and TV show episodes can be either purchased or rented.

WHAT'S AVAILABLE?

Apple's media store offers a comprehensive collection of Hollywood movies, plus TV shows from the major broadcast and cable networks, including Showtime and HBO. Many of the films include what Apple calls iTunes Extras: deleted scenes, making-of documentaries, music videos, and so on. Just be aware that iTunes Extras are viewable only on a computer or via Apple TV.

Most movies and TV episodes are available in either standard or HD (480p and 720p, respectively). Unlike most of the other services discussed here, you can download both rented and purchased content to your computer or Apple device. You must watch rented movies and TV shows within 30 days of downloading. Additionally, you must finish watching a rented movie within 24 hours of clicking the Play button. You have 48 hours to finish watching rented TV shows.

DEVICES WITH SUPPORT BUILT IN

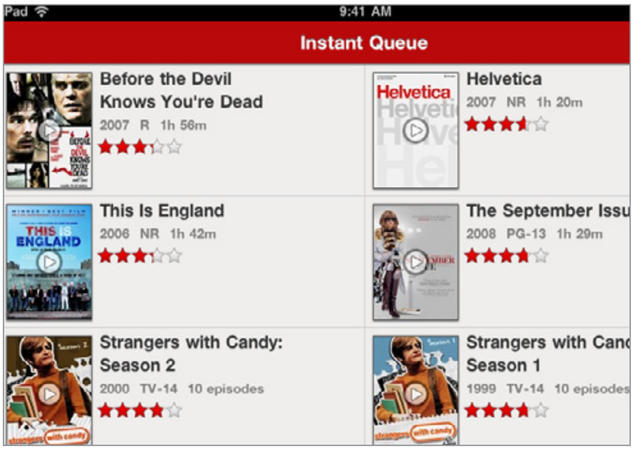
A TV connected to an Apple TV media player; most iPod models (HD content will require an iPod Touch); iOS devices (HD content will require iPhone 4); Mac or Windows PC (via the iTunes software).

PRICING

To rent newly released movies, you're typically looking at $3.99 for standard-def, and $4.99 for HD. To buy that same content, you'll usually pay $14.99 and $19.99, respectively. Most TV shows sell for $1.99 for standard-def and $2.99 for HD.

OUR TAKE

If Apple had its way, you'd only be able to watch iTunes content on Apple products. The company's almost there now, supporting Windows only because of its huge, dominating installed base. Fortunately, you'll find other video-on-demand services delivering the same content on a wide variety of platforms, including the PC, Android, and iOS. We see very little reason to patronize iTunes these days for anything other than music (and we can recommend plenty of alternatives on that score, too).



NETFLIX

WHAT IS IT?

Netflix started out renting DVDs by mail, but now emphasizes its subscription-based video-streaming service over renting physical discs. As a Netflix subscriber, you can stream as many movies and TV episodes as you like, but you can't download the videos to any device.

WHAT'S AVAILABLE

You'll find Hollywood movies, TV episodes from broadcast and cable networks (including Showtime but not HBO), and original movies and TV series carried on the Starz cable network. Netflix boasts a high-quality back catalog of streaming content, but it takes a long time for new movies to become available for streaming, and TV episodes generally don't become available until after their seasons have been released on disc. Videos are streamed at the highest resolution your Internet connection can deliver, up to a maximum of 720p.

DEVICES WITH SUPPORT BUILT IN

Various HDTVs from LG, Panasonic, Samsung, Sony, and Vizio; various Blu-ray disc players from LG, Panasonic, Sony, Toshiba, and others; TiVo DVRs; most media players, including the Apple TV, Boxee Box, Google TV, Roku, and WD TV Live; PlayStation 3, Nintendo Wii, and Xbox 360; iOS devices (via an app); Mac or Windows PCs (via web browser).

PRICING

A Netflix "Watch Instantly" account costs a minimum of $7.99 per month. This baseline plan doesn't include any physical disc rentals, but it also places no limit on the number of videos you can stream. Of course, Netflix continues to offer plans that include physical disc rentals, and each throws in unlimited streaming as a value-added service.

OUR TAKE

Netflix' $7.99 streaming-only plan is a great deal if you don't mind very long waits for newer movies and TV episodes to make their way onto the service. In an effort to appease Hollywood, which apparently fears that Netflix will dominate the post-theater retail movie business in the same way that Apple has come to dominate the music distribution market, Netflix cut deals with most of the studios to not rent new movies on disc until they've been available at retail for 28 days. New movies and current television episodes take much, much longer to make their way to Netflix' streaming service. Meanwhile, pay-per-view services such as Vudu offer new movies online the very same day they're released on disc. Regardless, we still recommend Netflix' streaming-only subscriptions for movies, but we think Hulu Plus delivers a far better experience for TV junkies.

INTERACTIVE TV SERVICES

YAHOO CONNECTED TV

WHAT IS IT?

Yahoo Connected TV is an umbrella term for Yahoo's smart TV initiative. It's similar to Google TV in that it's a platform that seeks to integrate the TV-viewing experience with the Internet, but Yahoo's effort is smaller and more targeted. Indeed, while Google TV attempts to aggregate content from virtually every venue where video is available, Yahoo Connected TV is more of a framework for third-party widgets that leverage live TV and various VOD sources, and bring popular online social media services to your TV.

WHAT'S AVAILABLE?

Widgets from Amazon Instant Video and Blockbuster On Demand enable you to rent and stream movies and TV episodes. Other widgets deliver video content available only on the web, such as Internet TV shows from Revision3. You can also hook into Facebook and Twitter, share digital photos using Flickr, and buy and sell goods on eBay. You'll also find widgets for weather reports, casual games, and stock tickers.

DEVICES WITH SUPPORT BUILT IN

As we went to press, the only devices to support Yahoo Connected TV were a handful of TV models from LG, Samsung, Sony, Toshiba, and Vizio. D-Link has demoed a set-top box that you can plug into any TV, but the product wasn't shipping at press time.

PRICING

Incremental costs are probably folded into the prices of TVs that support Yahoo Connected TV, but there is no direct cost to the consumer. That said, some of the content widgets cost money and are sold through an app store, but these are entirely optional. And, of course, if you use pay-as-you-go services such as Amazon Instant Video, you'll have to pony up for those, as well.

OUR TAKE

The technology behind Yahoo Connected TV isn't nearly as disruptive as the tech behind Google TV, and maybe that's why it seems to be enjoying a bit more early success. We'd rather play games on our computers or tablets than on our TVs, but there are plenty of other worthwhile widgets in the service's universe. For example, it's much more fun to share Flickr photos on a big TV screen than to huddle around a PC—and this is another reason why we think an HDTV's visual quality is so important.

MLB.TV

WHAT IS IT?

This service, owned by Major League Baseball, points to the future of smart TV sports coverage. Leveraging a sport with lots of teams, a very long season, and an obsession with stats, MLB.TV is a baseball fanatic's interactive dream.

WHAT'S AVAILABLE?

You can watch any regular-season game that's available in your market in 720p resolution. Games, however, are subject to local-market blackout restrictions. If your game is blacked out, you can't view it until 90 minutes after the final pitch.

You get in-game highlights, stats, and alternate audio options (you can choose between the home or away team's audio feed, for instance). A widget tracks the pitcher's performance in a video overlay, and you can replay any player's at-bat on demand. A fantasy league tracker alerts you when players you've drafted are on-deck, so you can switch to their at-bats via a picture-in-picture.

A premium package adds the ability to watch either the home or away team's video feed. This package also includes a multi-game mode that lets you watch up to four in-market games simultaneously (using either picture-in-picture or split-screen).

DEVICES WITH SUPPORT BUILT IN

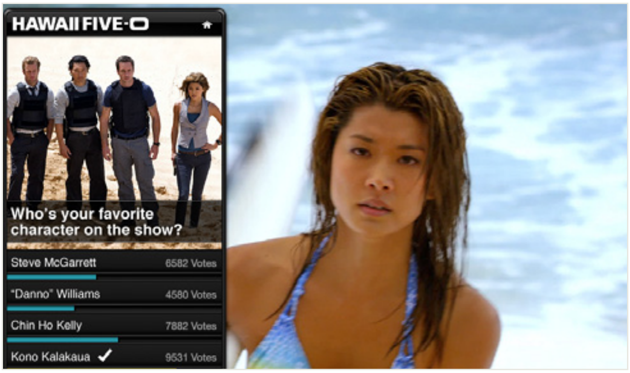
Various HDTVs from LG and Samsung; various Blu-ray players from LG and Samsung; Roku networked media players; Boxee devices (including the D-Link Boxee Box); Apple TV; Sony PlayStation 3; and Android and iOS devices. Note: Not every feature is available on every device.

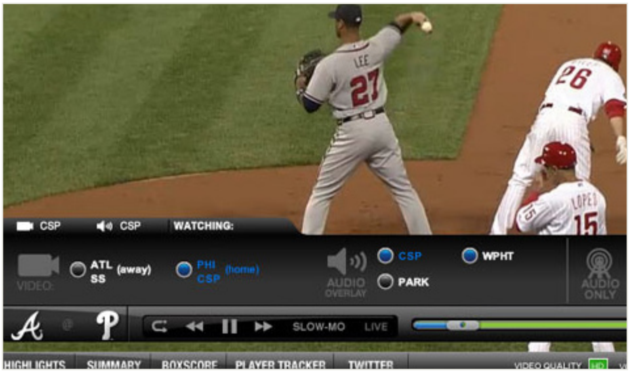
PRICING

MLB.TV costs $19.99 monthly or $99.99 yearly. MLB.TV Premium is $24.99 or $119.99, respectively. One subscription can be activated on multiple devices, but you'll need to purchase and install Major League Baseball's At Bat 11 app ($14.99 per device) to use the service with mobile devices.

OUR TAKE

Major League Baseball understands what its fans want, and it knows how to leverage the smart TV concept to bring them a great interactive experience—either on the TV or on a second, supplemental screen. Only hardcore fans will be willing to pay the steep entry fees, but there are plenty of *those* out there.





Video-on-demand is an inviting proposition, but its main appeal lies in its convenience and potential money savings. But the other elements of smart TV—namely, interactive services that marry video content to online data retrieval—have the potential to resurrect Marshall McLuhan from the dead just so his ghost could say, "Sweet!" Here's what's available today.

GOOGLE TV

WHAT IS IT?

Google TV is an open hardware and software platform designed to combine the power of the Internet with compelling video content—from Hollywood movies and TV shows, to YouTube clips and other viral fare, to personal content on your local network. Think of it as an electronic program guide that lists not only the content that's available on TV right now and in the coming weeks, but also what's available for streaming over the Internet. On top of that, using a picture-in-picture window or video overlay, Google TV can present real-time information about whatever you happen to be watching: player stats if you're watching a game, actor profiles if you're watching a movie, and so on.

WHAT'S AVAILABLE?

Google's smart TV technology can deliver any content located on your home network, anything on live TV, anything recorded on your Dish Network set-top box, and virtually any content available on the Internet—just as long as the content owner doesn't object. Right now, however, all the major television networks vigorously object and are blocking Google TV from presenting their online content. And because the networks own a chunk of Hulu, Google TV can't deliver that, either.

DEVICES WITH SUPPORT BUILT IN

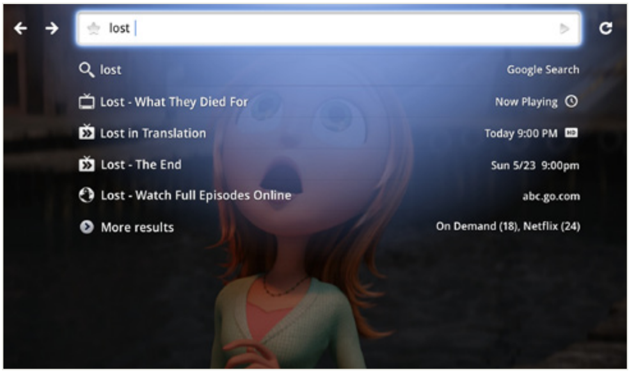
Sony's Internet TV, Sony's Internet TV Blu-ray player, Dish Network's set-top box, and Logitech's Revue set-top box.

PRICING

Google TV is only available integrated into another product. It's not sold as an app, so you can't run it on a PC. While there are no subscription fees, Dish Network will tack a $4 "DVR integration" fee onto your monthly bill if you connect the service to its set-top box.

OUR TAKE

Google set out to change the way we watch TV, combining the power of Internet search with TV content. But the initiative crashed head-on into entrenched interests that fear Google will interrupt their advertising revenue streams. It's too soon to say if the latest version of Google TV will make the service any more worth having, but we do know you still can't get Hulu or other online content owned by the major broadcast and pay-TV networks with it.



NBA LEAGUE PASS

WHAT IS IT?

NBA League Pass Broadband and NBA League Pass Mobile allow you to stream regular-season NBA games to your PC or mobile device. In addition to being able to watch games that might not be broadcast in your area, you also get real-time stats and other features. This service is co-owned by the NBA and Turner Sports Interactive, and games are subject to the same blackout restrictions that you'll encounter with normal TV broadcasts.

WHAT'S AVAILABLE?

The Broadband package lets you watch as many as 40 regular-season games per week, including up to three games at the same time. Games available in high-def are streamed in an unspecified level of HD to your device, with live stats overlaid on top of the video. A DVR function allows you to produce your own instant replays, and you have access to a full season's worth of archives (on-demand replays are available 48 hours after they've been played). The Mobile package allows you to watch up to 40 games per week on your iOS or Android device.

DEVICES WITH SUPPORT BUILT IN

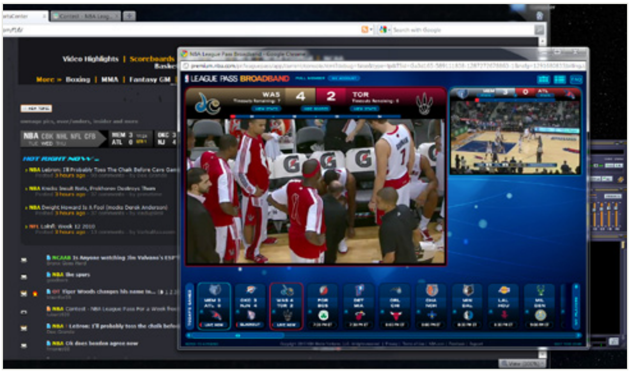
This service is available on a Mac or Windows PC, Roku devices, as well as iPod, iPhone, and Android devices (via apps). There is also limited support for Apple TV.

PRICING

An NBA League Pass Broadband subscription is included in the purchase of an NBA League Pass TV subscription (prices vary per cable or satellite provider). If you're not paying for the TV channel, however, you can opt for a Broadband "Choice" subscription (which allows you to follow up to seven teams) for $24.99 per season. To follow all 30 NBA teams, you'll need to pay $49.95 per season for the "Premium" subscription. NBA League Pass Mobile subscriptions cost $16.99 per season.

OUR TAKE

The NBA is off to a good start, but pro basketball could take a few lessons from Major League Baseball: The full version of NBA League Pass should be available as a widget in connected TVs and set-top boxes (only NBA Game Time Lite is available on those devices today). Regardless, both the NBA and MLB are way ahead of the NFL, which doesn't offer interactive squat.



CONNECTED TVS & SET-TOP BOXES

Did you find one of the video-on-demand or interactive TV services on the preceding pages to your liking? Now it's time to delve deeper into the hardware that might support the particular iteration of smart TV that suits your fancy. Here are our choices, ranked from least appealing to most compelling. See the next page for our *top* recommendation: a home theater PC.

HDTV

You might think the best way to get smart TV is to buy, well, a smart TV. Think again! Don't toss your current TV if the only thing it's lacking is smart TV features—we'll show you plenty of cheaper—and in some cases, better—alternatives. If, on the other hand, you've been longing to upgrade to a bigger screen, or if you want to move up from LCD to plasma, or to a model that supports 3D, smart TV features will most likely be included. Don't fret about which services are included, though; concentrate on image quality, instead.

LOGITECH REVUE (GOOGLE TV)

If you really want the Google TV experience, Logitech is blowing out its Revue inventory—we've seen it selling online for as little as $100 (it hit the market at $299). Logitech CEO Guerrino De Luca recently told analysts that the decision to support Google TV, which he described as a "beta product," cost the company $100 million in operating profit. De Luca says the company has no immediate plans to produce a Revue 2. Ouch.

APPLE TV

Even hardcore Apple fans were disappointed with the Apple TV set-top box when it was first introduced. The device was capable of streaming content from only four online services—Netflix, YouTube, MobileMe, and Flickr—but has since added support for MLB.TV and NBA League Pass Broadband. We suspect Apple's *real* aspirations for Apple TV are focused on making the box a conduit for watching movies and TV episodes rented or purchased from iTunes. Apple TV sells for $99, but you'll find plenty of better products for the same price or less.

If you don't want to invest in a full-blown home-theater PC, we think D-Link's oddly shaped Boxee Box is the next best alternative.

VIDEOGAME CONSOLES

Microsoft's Xbox 360, Nintendo's Wii, and Sony's PlayStation 3 gaming consoles all have Internet connectivity, and all are capable of delivering various smart TV elements, including Netflix. The Xbox 360 and PlayStation 3 tend to be more smart TV-oriented than the Wii, and the Xbox 360 is even stronger, because it can use your PC as a bridge to connect to online services. You can also play games on these devices, of course, but isn't that what you bought your PC for?

BLU-RAY DISC PLAYERS

As with new HDTVs, just about any new Blu-ray disc player on the market will include a variety of smart TV features. We love Blu-ray as much for its high-definition audio as its HD video, but we think a home-theater PC makes the best Blu-ray player. Still, most people don't have the budget to put one of those in every room. Netflix support is common, but Vudu support is better if you're interested in renting the latest movies in HD. Prices start at less than $100, but features such as integrated Wi-Fi, multiple HDMI outputs, and SACD and DVD-Audio support will rapidly inflate the MSRP.

ROKU

Roku manufactured the very first Netflix streaming box, but the company has expanded significantly since then and now offers four models ranging in price from $50 to $100. Even the least expensive model, the LT, includes an integrated Wi-Fi adapter, 720p video resolution, and more than 350 content channels. A lot of that content is crap, however, and only the top-end product will stream your own content (albeit only from a USB storage device).

NETGEAR NEO TV NTV200

We like Netgear's streamer just a little bit more than Roku's lineup, almost exclusively because it supports Vudu. It can't stream content you own, but it does have an integrated Wi-Fi adapter and it does deliver video resolution up to 1080p. And it only costs $80.

WESTERN DIGITAL WD TV LIVE

Western Digital practically owns the networked media-streamer market, thanks to its exceptional WD TV Live product. It supports nearly every important online media service (with the notable exception of Vudu), it will stream all your own content from any network or USB source at video resolutions up to 1080p, it supports every important media codec and container format, it has an integrated Wi-Fi adapter, and it costs just $130.

D-LINK BOXEE BOX

If you're looking for just a little more than what the WD TV Live can do (Vudu support, the ability to send web videos to the Boxee Box from a web browser, and—coming soon—an optional USB TV tuner), then you should take a hard look at D-Link's Boxee Box. It's priced higher than the Roku, Netgear, and Western Digital products ($180), but the price bump is fully justified by its extensive feature list.

HOME THEATER PCs

Looking for the ultimate smart TV experience? Pick up a home-theater PC. You can subscribe to any online service your heart desires, stream your own content, and lots more. In fact, these machines can do almost anything a desktop PC can do. Here's a quick look at five classes of HTPC.

ALL-IN-ONE PC

An all-in-one PC is a great solution if you're looking for an entertainment system for your kitchen, bedroom, den, or even your garage. This class of machine integrates an entire desktop computer, display, and speakers inside a chassis that's only slightly thicker than the typical monitor.

These machines come with everything you need, including an integrated Wi-Fi adapter, a wireless mouse and keyboard, and a TV tuner. Add an aftermarket USB CableCARD product, such as Ceton's InfiniTV4, and you can watch and record digital cable TV programming—including premium channels such as HBO.

Prices vary according to the size of the display, but models boasting large monitors typically also deliver faster CPUs, larger hard drives, and more features overall. Many higher-end models, such as HP's TouchSmart 610 (read our review at bit.ly/rI17O3), include an HDMI input, so you can use the display with a game console, set-top box, or other video source. Machines in this price range also typically include an integrated Blu-ray drive, which is useful for watching rented Blu-ray movies (we recommend ripping purchased movies and storing them on a central server).

The obvious downside to buying an all-in-one machine is that it will be almost impossible to upgrade it down the road.

VELCRO PC

We coined this term to describe a personal computer that's small enough to be attached to the back of a display using that famously sticky fabric (you can read our review of Zotac's ZBox Nano AD10 Plus at bit.ly/v5gejb). Such machines often do not include an optical drive, but they can stream just about any video from a network server or from any of the online media services we've mentioned.

A Velcro PC is like a networked media player (e.g., a Roku or WD TV Live) on steroids. Like that class of device, you can connect a Velcro PC to any size display you like—just make sure it delivers video resolution of at least 1920x1080 pixels. Unlike most networked media players, a Velcro PC includes integrated storage, and it will run a full operating system (ranging from almost any Linux distro to any flavor of Windows). And since it's a bona fide PC, online media services such as Hulu can't block it.

Zotac's ZBox Nano AD10 Plus can be mounted to the back of any VESA-compatible monitor.

The CineMagix HTPC, from boutique builder Velocity Micro.

MINI HTPC

This class of computer is a step up from a Velcro PC in that it comes with an integrated Blu-ray drive. You might think of it as an all-minus-one, because the only thing you need to add is an HDTV (and amplified speakers if you don't want to rely on the tiny speakers inside the TV). Acer builds our favorite machine in this category: The super-thin Revo RL100-UR20P comes with a Blu-ray drive and a slick, backlit wireless keyboard/trackpad that's easy to use, even in a darkened room. Read our review at bit.ly/tpHQ6O.

DIY HTPC

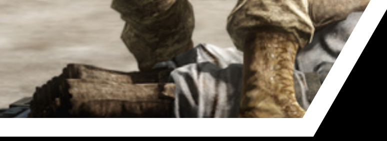
When you know *exactly* what you want in a computer, there's no better way to get it than to build it yourself. One easy solution is to start with a bare-bones kit, such as the AsRock Vision 3D (read our review at bit.ly/w3g7vF). This machine includes a Blu-ray drive, an Intel Core i3-370M CPU, and a discrete Nvidia GPU that's sufficiently robust for many newer games. Add Nvidia's 3D Vision kit and hook up a 3D monitor, HDTV, or video projector (our favorite display solution), and you can play games and watch movies in 3D.

If you want to build an all-out home-theater PC that's capable of playing not only Blu-ray movies, but also today's most ambitious games, you can do that, too. We built just such a beast in our December issue, using an Asus Maximum IV Gene-Z motherboard, Intel's Core i5-2500K CPU, and Nvidia's GeForce GTX 560 Ti. Don't have that issue? Just point your browser to bit.ly/rN8kMz.

BOUTIQUE HTPC

Want a top-shelf rig for your entertainment center, but don't have time to build your own? That's where boutique PC builders enter the picture. These vendors will start you off with a basic configuration and then let you customize it to fit your precise needs.

Take Velocity Micro's CineMagix Grand Theater Entertainment System, for example. This $1,550 rig includes a full-size ATX motherboard with an Intel Core i5-2300 CPU, 4GB of DDR3 memory, an AMD Radeon HD 5450 videocard, and a digital HDTV tuner. Since these machines are built to order, you can substitute and add components as you see fit.



BY GORDON MAH UNG

THE RETURN OF "REAL" GAMING

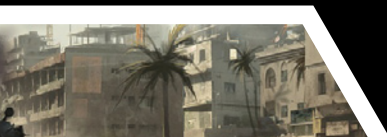
WITH 64-PLAYER MAPS, EXQUISITE TEXTURES, AMAZING PHYSICS, AND TESSELLATION THAT CONSOLES CAN ONLY DREAM OF, PC GAMING IS UNDERGOING A RENAISSANCE

WASN'T IT JUST FOUR YEARS ago that the pundits and game media gathered in wake, made a few pithy quips about graphics and soundcard drivers, and poured their 40-ouncers over the grave of PC gaming? Well guess what, baby—PC gaming ain't dead by a long shot. In fact, there's a strong argument that PC gaming is not only alive and well, it's thriving and poised to dominate consoles.

Don't believe us? Battlefield 3, one of the most anticipated launches of the year, only offers 64-player goodness to those on the PC, and tweaks the frak out of PC-only graphics that make game consoles look like peddlers of VGA output in a 1080p world. Smash a window in Batman: Arkham City on a PC with PhysX support, and you're rewarded with glass particles flying everywhere—just as if you threw a thug through a plate glass window in real life. Do that on a console, and you're rewarded with a pathetic tinkle.

Let's not even talk about The Elder Scrolls V: Skyrim, which has enhanced textures and graphics on the PC that its developer, Bethesda, says will "melt your face." And hell, we haven't even gotten to the PC-only titles of Star Wars: The Old Republic, Dota 2, and Diablo III, or the free-to-play phenomenon and MMOs.

So are we seeing a resurgence of PC gaming, or are we just fooling ourselves? To find out, read our report on whether "real" gaming has returned. Then read our reviews of The Elder Scrolls V: Skyrim and Batman: Arkham City, two of the latest games to celebrate what PCs uniquely offer; and finally, take a gander at our list of the 10 best free PC games online. If we are fooling ourselves about a PC gaming comeback, we're having a kick-ass time of it.



IS PC GAMING BACK WITH A VENGEANCE?

Here's how several of our industry sources see it

IF WE WERE litigators arguing the case of PC gaming vs. console gaming in front of the Supreme Court of Gamers, we wouldn't have to make much of an argument. Better graphics. More advanced physics. Higher resolutions. Superior controllers. Superior gameplay. We rest our case.

Yet none of those arguments were worth a damn just five years ago when it seemed that every game developer was bailing on the PC in favor of consoles. The PC was lucky to get even a crappy port. And special enhancements for that $400 videocard or super-cool soundcard? Are you kidding? Indeed, even the most die-hard PC gamer will have to admit that things looked pretty bleak back then. So why should anyone believe that the complicated and infamously cantankerous PC gaming platform is truly making a comeback?

Dan Stapleton, editor-in-chief at GameSpy.com, says PC gaming is indeed on the upswing, and he thinks there's even proof in the numbers.

"If we're talking about raw numbers, how about 30 million active Steam accounts, 15 million League of Legends accounts, more than 10 million World of Warcraft players, and 4 million Minecraft sales?" Stapleton says. "Those are huge numbers, and each is representative of the things that are really driving modern PC gaming: aggressive digital distribution, free-to-play gaming, MMOs, and unfettered indie developers."

Stapleton says the performance gulf between the PC and console is so big right now that he suspects console players are envious.

"You can't look at the visual difference between Skyrim, Batman: Arkham City, or Battlefield 3 running on a console next to the PC and not be at least a little jealous," Stapleton says. "We're also getting amazing deals from Steam sales, and entire genres like real-time strategy that just don't work well on consoles. I don't want to paint all console gamers with one brush, but PC gaming is pretty compelling right now."

IT'S ALL IN HOW YOU COUNT IT

That sentiment is certainly echoed by the PC Gaming Alliance. Formed in 2008, when PC gaming's light was at its dimmest, the PCGA obviously has a bias, as it is chartered with pushing all things PC gaming, but the Alliance has some persuasive points.

"Two gaming platforms have died in the last 10 years: Xbox 1 and Game Cube," says Matt Ployhar, current president of the PCGA. "PC gaming is alive and well; unfortunately, that message just wasn't getting reported."

Ployhar also says much of the problem came from analysts looking only at retail sales of PC gaming and not digital sales. The stats also failed to count microtransactions and MMO subscriptions—two huge growth areas. Another weakness of the numbers game, Ployhar says, is that PC gaming is largely gauged by North America and ignores a huge swath of PC gaming overseas. China alone, he says, now has eight of the top 10 PC gaming companies that are raking in cash. That's not even counting the massive growth of casual gamers on Farmville, Facebook, or Bejeweled.

Another unfair tactic by analysts and press is to lump all consoles as one.

"That's like saying Ford, GM, and Chrysler ganged up on Toyota," he said. "Those games don't play on each other's platforms." But on the PC, a game that will run on an HP will run on a Dell or on your self-built box. Ployhar says his estimates put the install base of PC gamers at roughly 30 million enthusiasts, another 220 million performance and mainstream gamers, and another 350 million casual gamers.

BATTLEFILED 3: PC VS. CONSOLE

EA'S SHOOTER SHOWS OFF THE PC'S WIDENING ADVANTAGE

BATTLEFIELD 3, EA's newest team-based shooter, is one of the best examples yet of how the PC has pulled ahead of consoles as a gaming platform. Here are three examples of how the game plays better on the PC.

Player count: Battlefield 3's chaotic 64-player battles had to be toned down for the consoles. Only 24 players at a time can fight it out on the Xbox 360 or PS3.

That dwarfs the roughly 185 million console players, Ployhar says.

If anything, he says, it's console gaming that's threatened with extinction if the expected shift away from closed, proprietary platforms in favor of more open architectures and streaming games actually occurs.

Case closed? Not quite. Jesse Divnich, vice president of analyst services with Electronic Entertainment Design and Research, doesn't think it's quite so cut-and-dried that PC gaming is undergoing another golden age. Yes, social and casual gaming, or browser-based gaming, has seen an explosion, but traditional client-based PC gaming is only seeing modest growth.

Even statistics that show the PC is overwhelmingly the gaming platform of choice in developing nations such as China and India are likely to be fleeting, Divnich believes. In the same way that video games started on personal computers in the U.S. but moved to early consoles, Divnich expects that scenario to unfold in the developing world.

Divnich also thinks it's overly optimistic to count browser-based PC gaming in the same bucket as traditional PC gaming. Someone who plays Farmville, he says, isn't going to automatically step into Battlefield 3. And the old problem with the PC, that you must know your system requirements just to spool up a game, is still a turn-off for mainstream gamers.

THE TROUBLE WITH PCS

Not that consoles are without glitches. A lag problem with the PS3 version of Skyrim is so bad that gamers were ready to magic missile Bethesda. Yet Divnich says the key difference is that console players know it's the fault of developers. On a PC, "You instantly think, 'This must be something on my end.' Then you have to go to a FAQ and forums. On a console if something doesn't work, it's not my fault."

The PC hasn't been trouble-free with launches, either. Batman: Arkham City has DX11 issues due to the driver. And driver problems were so bad during the launch of id Software's game Rage this fall that it threw John Carmack into a nerd rage, in which he declared in an interview with Kotaku.com, "The driver issues at launch have been a real cluster!@#$." He goes on to say that the company does "not see the PC as the leading platform for games. That statement will enrage some people, but it is hard to characterize it otherwise; both console versions will have larger audiences than the PC version."

Michael Pachter, a high-profile analyst with Wedbush securities, agrees with Carmack that despite the PC's better specs, it will never be the primary platform for game developers because the massive number of console players and how much they spend is just too big to ignore. Despite that, Pachter says he's mostly bullish on PC gaming right now and thinks there is indeed somewhat of a resurgence in PC gaming.

"I think the console experience was great in 2005 and 2006. And it's the same today," he says. "The PC gaming experience has continued to get better and better. Very few games come out on the console and PC that don't have better graphics on the PC. Battlefield 3 is a good example."

Pachter also thinks there is an upside for PC gaming from browser gamers, or casual gamers. "We're getting new gamers through Facebook, who may or may not be 45-year-old housewives," he says, "But if they are, they have 10-year-old kids, and little Johnny can probably play games, too."

Pachter said the latest growth in traditional PC gaming can also be explained by rock-bottom prices for very powerful hardware. "My first PC in the 1980s was $3,500, and I remember spending $2,000 in the last decade on a pretty cool gaming PC," he says. "The idea that you can build yourself a rig [today] from scratch for $800 is pretty compelling."

BIG FAT GPUS AND CPUS STILL MATTER

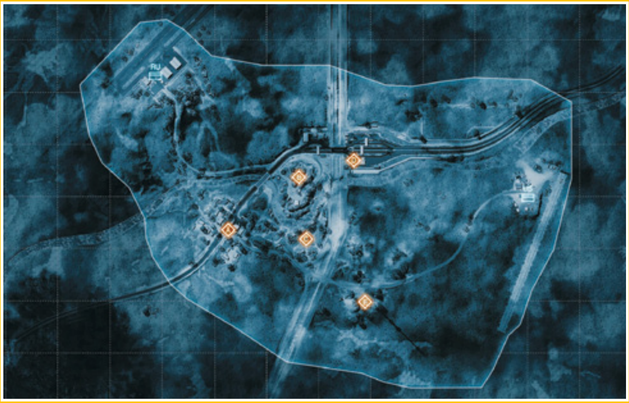
It's not just on the low end that the cash registers are ringing, either. Kelt Reeves, owner of boutique PC maker Falcon Northwest, says he's seen a spike in orders lately.

"We've had people specifically mention they're buying new systems for games like Battlefield 3, Skyrim, and Knights of the Old Republic. And these games are really pushing the hardware and delivering new levels of gorgeous visuals if you have the power. And I don't just mean DirectX 11 support, for which the flood of titles utilizing it has already arrived," Reeves says. "I mean just good old-fashioned power-hungry games. Battlefield 3 will eat every bit of GPU power you can throw at it, and if you want to run it at Ultra settings on a 30-inch monitor, you not only need a high-end SLI setup for a good frame rate, you also need 3 gigs of texture memory per card or the game will overrun your frame buffer. Skyrim is demanding on the videocards, as well, but it's the first game we've seen in a while that craves CPU power."

Nvidia is also seeing big sales from its GPUs. The company's latest earnings reports don't attribute a nearly 5 percent revenue increase to smartphones and tablets—instead the revenue mostly comes from high-end discrete GPUs.

"This happens every major game console cycle toward the second half of its product life, because PC technology advances on a regular basis instead of once every seven to 10 years," Nvidia CEO Jen-Hsun Huang said during a briefing with analysts and investors.

No matter whom you believe, the good news is that the debate isn't whether PC gaming's trajectory is headed straight down—it's a question of just how high up it will go.



Map size: To go along with smaller team sizes, console players get smaller maps, and not the massive battlegrounds that are available to PC gamers.

Frame rate and resolution: If you want crisp, fluid graphics, you'll need to play on a powerful gaming PC. Console versions of the game only play at 720p resolution and 30 frames per second.

Batman danced with the devil in the pale moonlight. And won.

Thanks to Nvidia's PhysX, the terrified look on this thug's face is hidden by a leaf as guest star Catwoman kicks his skull in.

BATMAN: ARKHAM CITY

The ultimate Batman experience

TO SAY THAT BATMAN: ARKHAM CITY is the best licensed game of all time is like saying Oreos are the best chocolate-and-cream sandwich cookies; sure, it's praise, but it's meaningless praise given the competition. A more impressive feat is that outside of the comics and graphic novels, Batman: Arkham City is the single best representation of the Batman property ever created.

A veritable who's who of Batman history, Arkham City manages to weave in just about every major Batman character, from Alfred to Zsasz. The main storyline focuses on Batman's fight to take down Arkham City from the inside out, all while dealing with the ever-present Joker threat. The tightly constructed narrative moves seamlessly from story beat to story beat, villain to villain, as it builds to a satisfying and surprising finale. It helps that every member of the voice acting cast is pitch perfect, from the brilliant psychotic lunacy of Mark Hamill's Joker to the gravelly snarl of Kevin Conroy's Batman.

The real star of the show, however, is Arkham City, the walled-off penal colony that serves as the game's setting and expansive hubworld. Arkham City's faded art deco splendor and gritty industrial slums come together to uniquely capture the seedy, noir soul of Gotham. This carefully selected cross-section of toppled landmarks, burned-out tenements, and rusty factories provides the perfect backdrop for Batman to do the usual Batman things.

And that's the true triumph of Batman: Arkham City—never before has Batman felt more like Batman. The caped crusader effortlessly grapples and glides his way around the city, flits from shadowy rooftops to darkened alleys, and makes full use of an impressive array of gadgets and utilities in his quest to clean up the rugged streets of Arkham City. Traversal is faster than ever as Batman literally flies across the city, and the open nature of Arkham City's world lets you smoothly transition from exploration, to stealth, to straightforward fisticuffs.

The free-flowing combat of Batman: Arkham Asylum makes a triumphant return in Arkham City, and with significant improvements. The core concept is still a two-button, timing-based system, focusing on strikes and counters and quickly moving from one target to the next. This go 'round, however, Batman has brought all his toys to the party. His utility belt is overflowing with handy gadgets which he can quick fire in the middle of combat without even breaking his combo.

Adding to the dynamic feel of both the fighting and the city at large is Nvidia's PhysX engine. Batman's cape clings and flutters realistically, dust and fog swirl around the legs of back alley thugs, leaves and trash float around the dilapidated streets, and shards of shattered glass and rock litter the broken pavement. The additions are subtle, but add significant atmosphere to an already detailed world.

And yes, even without PhysX, Batman: Arkham City is simply a phenomenal-looking game. The power of the PC is in full effect here; crisp hi-res textures and expansive draw distance ensure immersion even when viewing the entire city while gliding on high. Unfortunately, the game's performance takes a serious nosedive when DirectX 11 functions are enabled. While the game can run smoothly for stretches in DX11 mode, the frame rate will randomly, and fairly frequently, plummet to 5fps or lower, ultimately making the game unplayable. It's a shame too, as the DirectX 11 features look particularly nice, significantly enhancing the look of cloth and skin textures, and making characters appear decidedly less flat and plasticky than in DX9 mode.

There are a handful of other niggling technical issues, as well. The game's keyboard and mouse controls, thankfully, are not among them. The layout takes a bit of getting used to—this game uses a ton of buttons, thanks to 12 gadgets and several combat combo buttons—but feels better than a gamepad in the long run. The annoyance is simply that control settings cannot be changed when the game is running. In fact, no game settings can be changed once the game is launched—they can only be changed through the launcher application, before the game boots. Also, while we encountered no catastrophic errors, the game does take fairly long to boot, and we had several crashes with GFWL, forcing us to exit the program and restart.

Minor technical shortcomings aside, the PC version of Batman: Arkham City is clearly the definitive version of the definitive Batman experience. While it's a shame that the month delay between console and PC wasn't enough time to iron out all the kinks, the PC version still controls the best, runs the best, looks the best, and will provide you with the best Batman experience money can buy. –DAN SCHARFF

VERDICT 9

Batman: Arkham City

+ CHRISTIAN BALE Engaging story with fantastic voice acting; big world with tons of quests and puzzles; smooth-flowing combat and traversal; a Batcave's worth of fun gadgets.

– GEORGE CLOONEY Serious DX11 performance issues; can't change settings in-game; three layers of DRM is overkill; no PhysX on AMD GPUs.

$50, www.batmanarkhamcity.com, ESRB: T

You saw a mudcrab the other day? We saw this.

Dragons require a lot of percussive maintenance.

THE ELDER SCROLLS V: SKYRIM

Oh, hello, Dragon Age. Didn't see you there. Morrowho?

SKYRIM IS TORN by civil war: A weakened Empire struggles to retain control of the province, while rebel Nords vie for self-determination. Dragons have returned after centuries, and nobody knows why. Undead infest the crypts, cairns, and barrows, and more dangerous things haunt deep Dwarven ruins. Elsewhere, ordinary people are living their lives. Guilds struggle to reclaim past glory, shopkeepers try to scrape by, lovers quarrel, and everyone could use your help. Time to make your mark on the world.

Skyrim is a first-person RPG with a wide array of skills and abilities, loosely clumped under three main archetypes: the mage, the warrior, and the thief. Unlike earlier Elder Scrolls games, though, there are no tagged skills or premade character classes. Play the game how you like, and your character gets better at what it does most. Our first character was a flame-casting, axe-wielding Nord, but there are eight other player races and innumerable play styles, and Shouts add a new kind of mana-less magic to the game. The game's voice acting (for the most part), interface, and graphics are also leaps ahead of Oblivion's. Combat is more satisfying, if a bit repetitive after a while. Even killing dragons becomes almost routine as you increase in power.

Skyrim's main quest is an incredible tale that brings you from one end of the province to the other, from the highest mountain to the lowest depths, and encompasses stealth, diplomacy, adventuring, exploration, and a lot of combat. But it's a greatest-hits collection for a prolific band. It's a good starting point, and you'll get some of the best content, but if it's the only album you listen to, you'll miss most of the material, including stuff that's better than any of the hits. With superhuman focus you could beat the main quest in maybe 25 hours, but that's not how you should play Skyrim. Even running from one objective to another, we inevitably got sidetracked for hours by something—a small town, a crypt, a ruin—we spotted in passing. We clocked 55 hours of play time before reluctantly focusing on the main quest and still felt we'd just scratched the surface. One editor has put 90 hours in and has barely touched the main quest at all.

It wouldn't be a Bethesda open-world game without a heaping tablespoon of weirdness. Animals judder into the landscape or appear hundreds of feet in the air, then fall to their deaths. Every guard you meet complains about the arrow he took in the knee. Books and plates render slightly inside the shelves they're on, then go flying across the room. A giant's club rises into the air like a helium balloon. At times, the game would crash to desktop every hour or so. Good thing there's a mod for that.

That's one of the best things about playing Skyrim on a PC. In addition to the graphical superiority—consoles ain't got nothing on Skyrim at 1920x1200 at Ultra settings—the modding community corrects for bugs and idiosyncrasies faster than the developers. Look past the inevitable nude mods, and you'll see high-res texture packs, patches to fix Bethesda's blocky faces, interface tweaks, and more. This isn't to say Skyrim is a really buggy game. The few bugs that aren't fixed by patches or mods aren't enough to dampen our enthusiasm for the game world or the story.

If Skyrim was only as good as Morrowind or Oblivion, it'd be unskippable. But it's much, much better. It's certainly the best game Bethesda's ever made, and one of the best we've ever played. It's not without weird bugs and quirks, but the gameplay, story, and amount of content are all staggering, and we'll be playing it for months to come. –**NATHAN EDWARDS**

VERDICT **9** KICK ASS!

The Elder Scrolls V: Skyrim

+ **DWEMER** Vast, content-filled world; hundreds of hours of stuff to do; good leveling system, fun combat, compelling story.

− **FALMER** Occasionally buggy; not the most graphically intense game ever.

$60, www.elderscrolls.com, ESRB: M

10 AWESOME FREE-TO-PLAY PC GAMES

ONE OF THE biggest trends in PC gaming over the last half-decade has been the rise of the free-to-play (F2P) online business model. You might have heard it called "freemium," or the pejorative "pay to win," but whatever you call it, it's here to stay. Here are 10 of our favorite freebie titles. –ALEX CASTLE

AGE OF CONAN

At one time, Age of Conan was thought to have a chance at dethroning World of Warcraft. That, of course, did not happen, and now Funcom's low-fantasy MMO is free to play. Combat's a little more engaging than WoW's, and the graphics still look great.
www.ageofconan.com
Free: Four Classes, all pre-expansion zones, some raids and dungeons.
Pay: All classes, all content, siege warfare.

Age of Conan's mounts aren't quite as friendly as World of Warcraft's.

TEAM FORTRESS 2

We don't believe there's actually anyone out there who doesn't know about Team Fortress 2, but just in case, it's a fantastic, team-based shooter from Valve. It's got a great art style, and some of the best gameplay available.
www.tf2.com
Free: All maps, all classes, complete access to the core game, ability to unlock all items.
Pay: Immediate access to any item. Hats.

BATTLEFORGE

A real-time strategy game with CCG elements, BattleForge is a refreshingly unique online game from EA. Collect cards to create your army, then take your deck into real-time battle against opponents around the world.
www.battleforge.com
Free: All content and maps.
Pay: Additional packs of cards to quickly strengthen your deck; card rentals for certain game types.

CHAMPIONS ONLINE

A spiritual successor to Cryptic's popular City of Heroes/Villains MMOs, Champions Online features faster-paced combat and the same amazingly in-depth hero customization.
www.champions-online.com
Free: All core game content, a selection of character classes, pre-created skill-sets.
Pay: Additional "adventure pack" content, fully-customizable characters, access to additional skills.

D&D ONLINE

Another for-pay MMO gone free-to-play, Dungeons and Dragons Online is a dungeon-crawling MMO set in the world of Eberron. Game content is broken into module-style "Adventure Packs."
www.ddo.com
Free: Basic classes and races, a selection of free adventure packs.
Pay: Cosmetic and convenience items; additional races, classes, and adventure packs; more character slots.

LEAGUE OF LEGENDS

The most popular game in the emerging MOBA (or DotA) genre, LoL sees you controlling one of a gigantic roster of heroes in fast-paced, strategic RPG combat. It's notorious for its steep learning curve, but if you can get past that it's some of the best competition online.
www.leagueoflegends.com

Just one of the nearly 100 champions in League of Legends.

Free: All game modes and maps, a small rotating subset of heroes, unlockable heroes.
Pay: Instant permanent access to heroes, cosmetic upgrades.

LORD OF THE RINGS ONLINE

One of the first MMOs to successfully make the shift from a traditional subscriber model to a F2P system, LOTRO gives you WoW-esque fantasy MMO gameplay with a grittier, Middle Earth flavor.
www.lotro.com
Free: All basic classes and races, maximum level cap.
Pay: Cosmetic items, premium classes, miscellaneous perks, extra character slots.

VINDICTUS

Korean F2P powerhouse Nexon is behind quite a few F2P games, but few are as suited for western sensibilities as Vindictus. With gorgeous, dark graphics and fast-and-bloody combat, Vindictus is a great option for those who want to get their grind on for free.
www.vindictus.nexon.net
Free: Primary game (with weekly dungeon limit).
Pay: Additional dungeon runs, stat-boosting items. There's no real PvP, so pay-to-win isn't a concern.

WORLD OF TANKS

If you're more interested in hard-hitting strategic action than leveling up your umpteenth elvish ranger, check out World of Tanks. Play in online tank battles to earn money, train your crew, and upgrade your tanks. If you're patient, you can compete at high levels without paying a dime.
www.worldoftanks.com
Free: Tons of tanks and weapons to unlock, all maps and game modes.
Pay: Additional tanks and weapons to unlock; faster progression.

Team up and shell your opponents in World of Tanks.

GLOBAL AGENDA

Global Agenda is a team-based MMOFPS, similar to the older PlanetSide. In addition to PvP missions, the game includes tons of PvE content for you to team up and destroy.
www.globalagendagame.com
Free: All classes, skills, and zones.
Pay: Cosmetic upgrades; easier access to equipment.

WHITE PAP

BY BILL O'BRIEN

The U.S. Patent System

It's not perfect, but it works

Look up the word "patent" in a thesaurus and you'll see that its synonyms include "straightforward," "obvious," and "apparent." Ironic, since the U.S. Patent and Trademark Office only offers protection for "nonobvious" inventions, such as the process for "making pot and pearl ashes" that Samuel Hopkins came up with in 1790. That's right, the country's first patent was awarded for a cleaning formula used in soap making.

The USPTO has been cranking out patents at an increasingly breakneck pace ever since—these days, more than 150,000 per year.

WHAT IS A PATENT, EXACTLY?

We all might have some vague idea of what we think a patent is, but it's always best to go straight to the horse's mouth. Here's the federal government's definition—in surprisingly plain language:

> A patent for an invention is the grant of a property right to the inventor, issued by the United States Patent and Trademark Office. Generally, the term of a new patent is 20 years from the date on which the application for the patent was filed in the United States or, in special cases, from the date an earlier related application was filed, subject to the payment of maintenance fees. U.S. patent grants are effective only within the United States, U.S. territories, and U.S. possessions. Under certain circumstances, patent term extensions or adjustments may be available.
>
> The right conferred by the patent grant is, in the language of the statute and of the grant itself, the right to exclude others from making, using, offering for sale, or selling the invention in the United States, or importing the invention into the United States. What is granted is not the right to make, use, offer for sale, sell or import, but the right to exclude others from making, using, offering for sale, selling or importing the invention. Once a patent is issued, the patentee must enforce the patent without aid of the USPTO.

That seems straightforward enough: A patent is your proof of ownership, and everyone else should keep his or her hands off. The fact that the USPTO recognizes three types of patents doesn't complicate things much. A utility patent is granted to anyone who invents or discovers a new and useful process, a machine, an article of manufacture (defined as "a particular substance or commodity," e.g., an article of clothing), or any new and useful improvement thereof. A design patent covers the invention of a new, original, and ornamental design for an article of manufacture. A plant patent will be granted to anyone who invents or discovers and asexually reproduces any distinct and new variety of plant.

Leaving plants aside for a moment, note that you can patent an article of manufacture and you can also patent an "improvement" to an article of manufacture, as well as an "ornamental design" for an article of manufacture. That's one reason why several thousand varieties of tires, watches, refrigerators, washing machines, and other products can reach the market without violating the patents on the very first tires, watches, refrigerators, and washing machines to be invented. As for plants, maintaining ownership of horticultural or agricultural variants of existing specimens can be worth huge sums of money.

WHAT YOU CANNOT PATENT

While it might seem that you could patent anything you can think up, there are some restrictions. If whatever the invention is, for example, was known or used by others in the United States, or if another inventor patented or described it in print in a foreign country, it can't be patented here.

If you display your invention, describe it in print, or put it up for sale in the United States, you must apply for a patent within one year or lose the right to have one. Many governments outside the U.S. require you to apply for a patent on the first day of any such disclosure.

Even if your invention (or the improvement to an existing invention that you seek to patent) passes those two criteria, the difference between your invention and existing inventions (or improvements to existing inventions) must not be obvious. In the words of the USPTO, "The subject matter sought to be patented must be sufficiently different from what has been used or described before that it may be said to be nonobvious to a person having ordinary skill in the area of technology related to the invention."

So, for example, a second party can't patent a big, red can opener that is otherwise identical to a smaller, silver can opener. Some things slip through cracks, however: U.S. Patent 5,443,036, "Method of exercising a cat," which covers enticing a cat to chase the beam from a laser pointer, has been justifiably criticized for being somewhat obvious. The patent nonetheless remained in force at press time.

THE PATENT PROCESS

The process of filing for a patent isn't as simple as the definition of what can be patented might lead you to think. If you're new to the process, your best course of action is to hire an experienced patent attorney (in fact, that is the USPTO's recommended course of action.)

Some patent applications can take years to decide. The worst examples have been the recent flurry of business-method patents that disclose and claim new methods of doing business, such as new types of e-commerce,

ER

insurance, banking, tax compliance, and so on. According to the USPTO, the average patent application requires 24.6 months to wend its way through the department (although it takes just a few minutes to receive a patent application number if you file electronically).

One way to shorten this timeline is to file a "petition to make special," a request to jump ahead in the queue either because the inventor is over 65 or in ill health and might not survive to see his or her patent granted or denied, or if the invention combats terrorism, contributes to the ecology, or any of several other precisely defined reasons. You'll need to supply information in addition to what is normally required for a patent, and you'll be required to submit to a personal interview. PTMS patent applications can be approved in as little as 12 months.

If you're going through any version of the process, you're allowed to use a "patent pending" label on your invention in the interim. This provides no protection whatsoever for the invention; it's merely a warning to others that the device, process, or addition has been submitted for a patent and, if granted, anyone copying your work must cease or face prosecution. Unfortunately, they will not be forced to return any money they had made by selling their version of your invention prior to the granting of the patent.

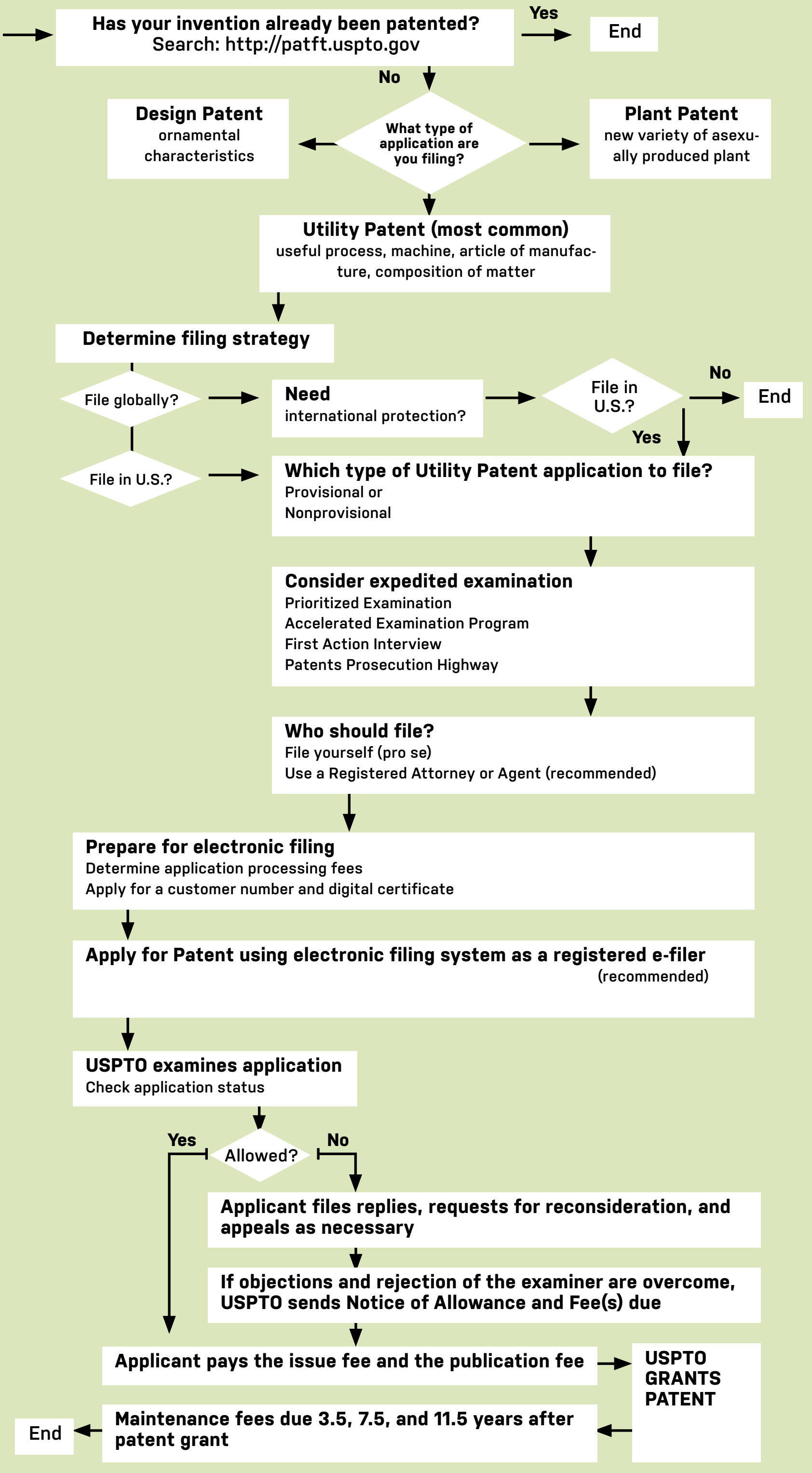
310 YEARS AND COUNTING

Software patents have become a major bugaboo for the USPTO lately. In terms of the content and arrangement of the code itself, software should be protected by a copyright, not a patent. On the other hand, a software program's look and feel could be legitimately patented. But there might well be only one way to efficiently write a procedure in any given programming language. By the same token, there might be just one method of presenting an option or dialog in any given WYSIWYG environment. Apple's new "slide to unlock" patent is just one example of this.

Considering it's more than 310 years old and has issued more than 8 million patents, the most surprising thing about the USPTO might be that it hasn't created more chaos and confusion. That's not to say that U.S. patent law doesn't need tweaking, but Congress should be mindful of the danger of fixing something that's not truly broken.

The U.S. Patent Application Process

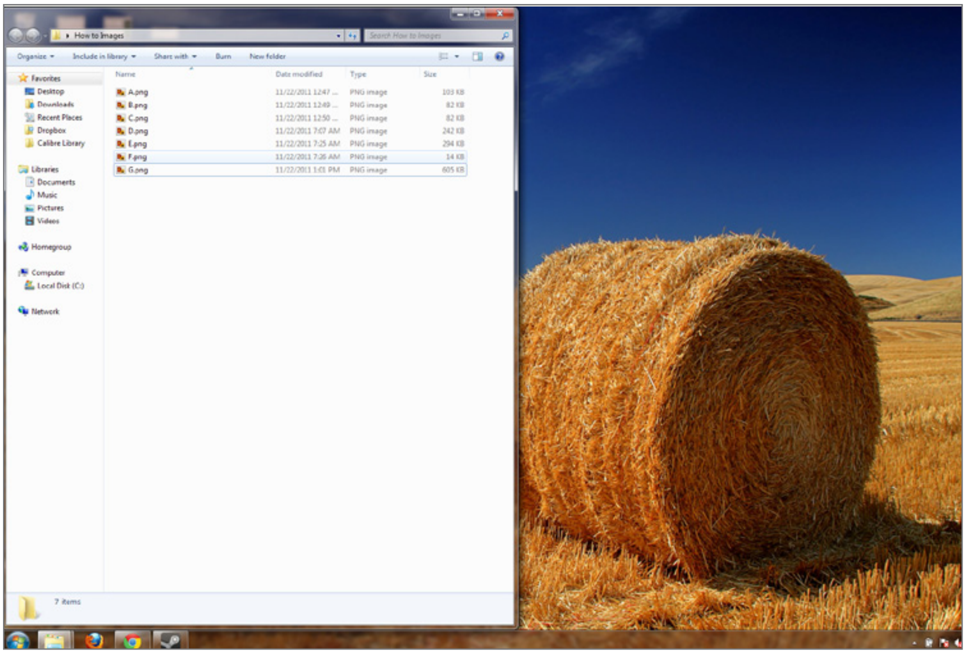
So you've come up with the greatest invention since sliced bread. Congratulations! Now get busy protecting your intellectual property by filing for a patent. Here are the steps you'll need to follow:



HOW TO

STEP-BY-STEP GUIDES TO IMPROVING YOUR PC

WINDOWS TIP OF THE MONTH



RECOVER A STRANDED WINDOW

When you use multiple displays (and especially if you switch between single- and multi-monitor modes) applications sometimes open new windows outside of the visible desktop. An easy way to get around this frustrating problem is simply to hit the Windows key plus the right and left keys until the errant window comes into view.

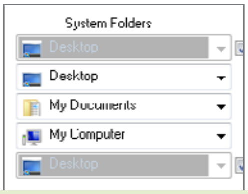
ALEX CASTLE
ONLINE MANAGING EDITOR

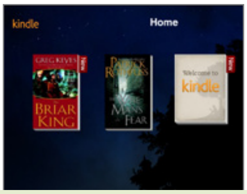
WHY NOT THE SURFACE?

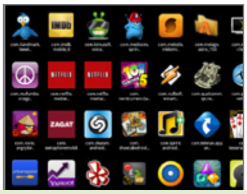
I'VE HAD A SOFT spot in my heart for surface computing ever since I built one of my own surface PCs a couple of years back (see the article at bit.ly/rEE6M8). So when Microsoft announces that its next-gen Surface PC is going on sale, I should be pretty excited, right? Not quite.

To me, the $8,400 no-practical-usage-scenario Samsung SUR40 (aka Microsoft Surface v2.0) is just another example of how Microsoft has taken a technology that I truly believe has potential, and turned it into a lame gimmick. In the years since the Surface was first announced, Apple has created a multitouch revolution with the iPhone and iPad—what have you done, Microsoft?

MAKE - USE - CREATE







62 Customize the Windows 7 File Browser Window

64 Borrow E-books for Free from Your Local Library

65 Sideload Android Apps

submit your How To project idea to: comments@maximumpc.com

Customize the Windows 7 File Browser Menu

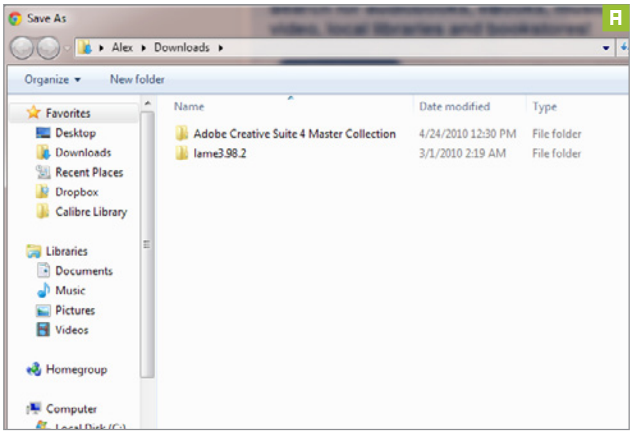
–Alex Castle

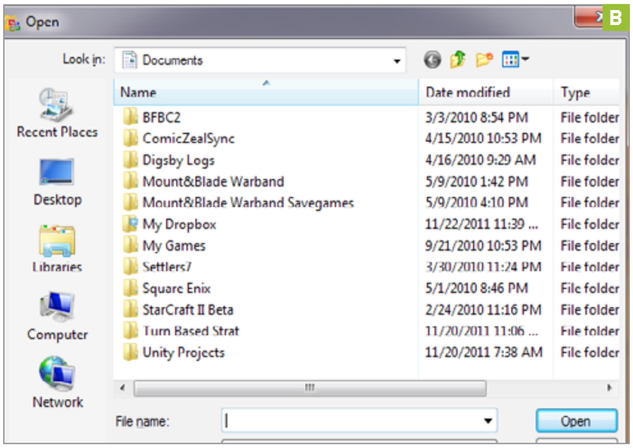
IN WINDOWS 7, browsing for files from within a program can be a bit confusing. Why? Because for some reason, there are two separate menus for exactly that function, and they behave differently.

The first sort of menu looks more or less like Explorer.exe **(image A)**. It's got a folder view in the main part of the window, and a navigation pane on the left side that makes it quick to get where you want to go. If you frequently save to or load from a particular location, you can make sure it's always at hand by dragging that location into your Favorites bar. This is the good window.

The second menu is a holdover from pre-Windows 7 days—it's the plain-old Open menu, with a small browser and a wimpy selection of predefined, uncustomizable shortcut icons on the left **(image B)**. It is, unfortunately, still more common in programs (including Adobe's Creative Suite) than the superior, newer menu.

Fortunately, you actually *can* customize the second type of file browser—it just takes some work. There's a way to do it in the system registry, but it's complicated and not necessary. Instead we'll use a free app called PlacesBar Editor.





1 DOWNLOAD PLACESBAR EDITOR

PlacesBar Editor is available for free at bit.ly/lqKxW. Simply follow the link to download the app, unzip it, and install it. Once it's installed, go ahead and run the program. The main interface is strangely complicated—despite an unnecessarily large assortment of buttons and icons on the top of the window, there's actually really only one thing we care about: the fields in the Windows tab.

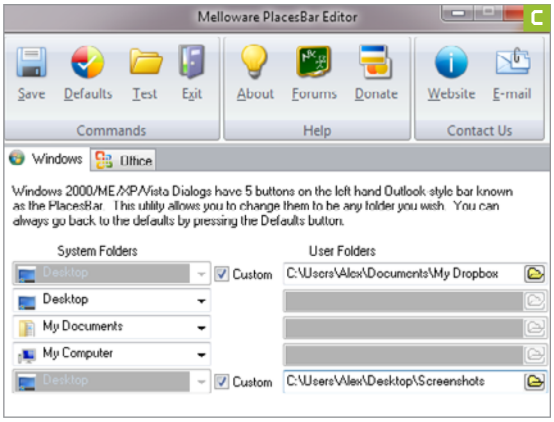
2 CUSTOMIZE YOUR WINDOWS PLACES BAR

The Windows tab lets you directly customize the line-up of five icons that appear in your places bar **(image C)**. For each of the five places, you can click the drop-down box on the right to select any system folder on your computer, such as My Documents, the Desktop, or My Computer. Most of these locations are already in the places bar, so you'll more likely use the field to the right (which you can enable by clicking the Custom checkbox).

» Here, you can add any non-system folder by simply entering its complete path in the text field, or clicking the folder icon and browsing for it. You can use any folder on your system, or any network location. We particularly like being able to add our Dropbox folder to our places list, as well as our working folder for screenshots.

» Once you've made your changes, you'll have to click the Save button at the top in order to have them take effect. At that point, you can click the Test button to open a sample file browser and make sure everything is in order.

» Note that when you click Save, all places bar icons are changed to the ones specified. In other words, you can't just use PlacesBar Editor to change a single location and keep the rest the same—you'll have to define a full set of five (or less) that you want to use. If, for whatever reason, you don't care for your new layout, you can click the Default button to get the old locations back.



Borrow E-books for Your Kindle or Kindle App

–Alex Castle

THESE DAYS, THERE are any number of ways to do your reading that don't involve anything quite so passé as paper and ink. There's plenty of dedicated reading hardware and software, but nothing as robust as Amazon's Kindle offerings. Between the Kindle, the Kindle Touch, the Kindle Fire, and the free Kindle apps for Android, iOS, and Windows, you can read your Kindle books virtually anywhere.

But still, there are certain advantages to paper books. Your Kindle doesn't have that new-book smell, or the satisfying heft of a good hardcover. Also, no digital reader can match the convenience and value of borrowing books for free from a public library—or can it?

Amazon has recently scored another point for e-books—you can now borrow books from your local public library from home and have them sent directly to your Kindle app or device, all for free. It's a fairly simple process—just follow these steps.

1 FIND AN OVERDRIVE LIBRARY

First, you'll need to find a library near you that supports the Kindle public library lending program. Currently, this is limited to libraries that use the OverDrive system for online book checkouts. Fortunately, the majority of libraries do use OverDrive, so you shouldn't have a hard time finding a qualifying library near you. To search all OverDrive libraries, go to search.overdrive.com and click Library Search.

2 GET A LIBRARY CARD

The whole library metaphor (and the legal ground that Amazon is standing on) would crumble if anyone in the world could borrow books from any library. That means that while you can borrow a book from the comfort of your own home, you'll have to have a library card to do so.

» Hopefully you already have a library card, but if you don't, you might be in for an outing. Most local libraries offer free borrowing privileges, but require proof of address, which must be shown in person. So get out that ID, haul yourself down to your local branch, and get yourself a card.

3 FIND A BOOK

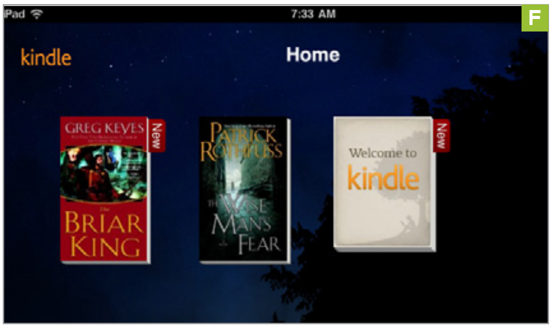
Now, you simply need to find a book to rent. Go to the OverDrive digital lending site for your library that you found in step one, and find the Advanced Search button. Then, click the Format drop-down and select Kindle Book **(image D)**.

» Like real books, the library only has a certain number of digital copies of each book available to lend out. If other Kindle users have already borrowed all the copies of a book you want to read, you'll have to add yourself to the queue for that book. To find a book you can borrow right now, check the box labelled "Only show titles with copies available."

4 DOWNLOAD THE BOOK TO KINDLE

Once you've found a book (or books—most libraries are pretty generous with the number of e-books you can have checked out at once) that you want to read, click the Add to Cart button underneath the Kindle icon, then click Checkout. When you finish the Library side of the checkout procedure, you'll be directed to Amazon.com, where you can enter your username and password, and select which of your Kindle devices you want the book sent to **(image E)**.

»The next time you open your Kindle device or app, you should be able to find the borrowed e-book in the Archived Items section. Now you can download the book to your device **(image F)** and start reading right away. Unlike library books, you can't keep these past their due date—if you've borrowed a popular book, make sure to read it before the expiration date, or you'll have to go to the back of the line before you can check it out again.



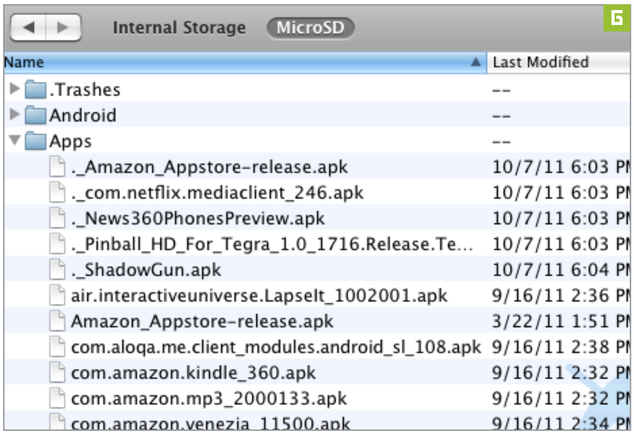
Sideload Android Apps –Markkus Rovito

YOU'VE FOUND that hot new app on the Android Market, and you can't wait to click the Install button. But you're getting the message that the app isn't compatible with your device. Being the good Maximum user that you are, you'd rather find out for yourself. Those messages are sometimes wrong, after all. Or perhaps you want to take advantage of the daily giveaways in the Amazon Appstore. Or, if you're one of the millions of Kindle Fire owners, you may want more choices than the limited Amazon Appstore provides. All of the above comprise sufficient reason to start sideloading apps to your Android device.

1 GET SOME APPS TO SIDELOAD

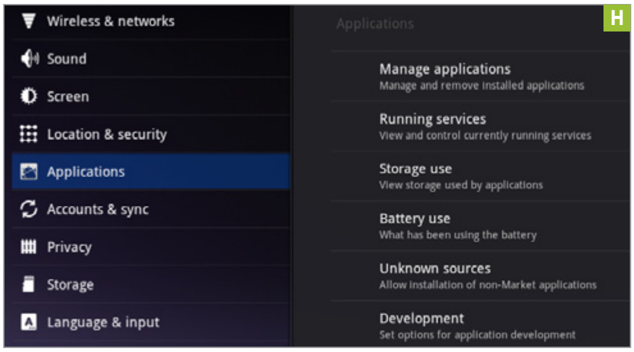
The reason you sideload apps in the first place is because you're sourcing them from a place other than the sanctioned method, which is usually the Android Market or some device-specific boutique app store. Android Apps come in the form of .apk files. You can procure such files from a prior device backup, straight from a developer's website, and of course from… the Internet (you know the deal).

» Next, transfer those .apk files from your PC to your Android however you like: on a microSD card (image G), through a cloud service such as Dropbox, via a USB transfer, etc. Just remember what directory those files end up in, so you don't have to root through too many folders looking for them later.



2 TWEAK APPLICATIONS SETTINGS

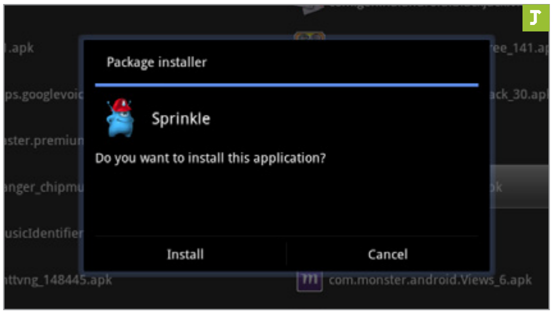
The default setting in Android is to not allow the installation of non-Market applications. Fie on that! Go to your Android device's Settings, and under Applications, check the "Unknown sources" box (image H), allowing you, in effect, to sideload. Some unfortunate souls may have tyrannical devices that have modded the Android OS to not allow sideloading at all, in which case they'll have to look into rooting the device or installing custom Android ROMs. But that's a whole other How To.



3 INSTALL THE APPS THROUGH A FILE MANAGER

To install your .apk apps, you essentially launch the files through a file manager app. Many Android devices come with a file manager preloaded. For the rest, there are tons of file managers out there and a good handful of high-quality free ones. If you have access to the Android Market, like most Android users, we like Metago's Astro File Manager or Rhythm Software's File Manager HD for Honeycomb tablets. For folks locked into the Amazon Appstore (users of the Grid10, Kindle Fire, etc.), we prefer ES File Explorer.

» Because you heeded our warning to remember what folder your .apk's are in, you just need to launch your file manager and find them (image I). If they're on a microSD card, you'll probably need to hit the file manager's Up button a couple of times to find the "Removable" directory. Touching an .apk icon will open the Package Installer, where you can touch the Install button to finish the deed (image J). Now that app, whether it will function properly or not, is ready to launch. Enjoy the sweet freedom of the gray market!



BUILD IT

NATHAN EDWARDS **SENIOR EDITOR**

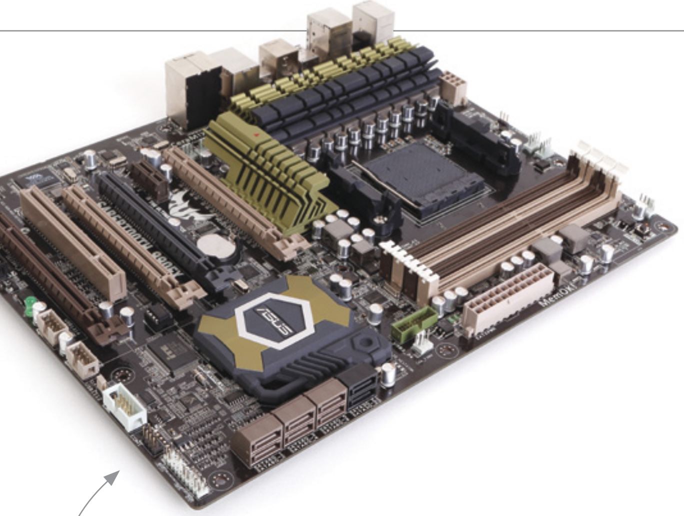
Rumbling into Bulldozerland

Can AMD's eight-core CPU be the centerpiece of a kick-ass rig?

LENGTH OF TIME: **3 HOURS** | LEVEL OF DIFFICULTY: **INTERMEDIATE**

THE MISSION AMD's Bulldozer architecture finally hit retail in October 2011, and deputy editor Gordon Mah Ung put the highest-performing chip, the FX-8150, through the wringer (see our Holiday 2011 issue). His conclusion: It's a decent competitor to Intel's i5-2500K, but no match for the (much more expensive) Sandy Bridge-E or 2600K parts. And that's OK; there are plenty of reasons to want a solid midrange performer. Maybe you really, really want to be able to say you have an eight-core processor. Maybe you're opposed to Intel for religious reasons. Or maybe you just want real PCIe x16 lanes without having to put out for the pricey X79 platform.

Whatever your reason, an FX-8150 can be a respectable foundation for a solid gaming rig since modern gaming is still more about the GPU than the CPU. For this build, I took AMD's flagship processor and built a $1,500 gaming rig around it. In the end, I realized that $1,500 gets you a lot of PC these days.



INGREDIENTS

PART/URL	PRICE
Case NZXT Phantom 410 www.nzxt.com	$99
PSU Corsair TX750 v2 www.corsair.com	$105
Mobo Asus Sabertooth 990FX www.asus.com	$189
CPU AMD FX-8150 www.amd.com	$269
Cooler AMD Bulldozer Liquid Cooling Kit www.amd.com	$100
GPU XFX Radeon HD 6970 www.xfxforce.com	$330
RAM 38GB Patriot G2 DDR3/1600 www.patriot.com	$49
Optical Drive Plextor PX-850SA DVD burner www.plextor.com	$25
Hard Drive 750GB Seagate Momentus XT www.seagate.com	$239
OS Windows 7 Professional 64-bit (OEM) www.microsoft.com	$99
TOTAL	**$1,504**

BUILDING FROM THE CPU OUT

CENTRAL TO MY BUILD, of course, is AMD's top-tier Bulldozer part, the 3.6GHz FX-8150. It'll rest in Asus's Sabertooth 990FX motherboard, which has USB 3.0, six SATA 6Gb/s ports, and plenty of PCIe x16 lanes. The 990FX isn't markedly different from 890FX, except for one glaring change: Board vendors are now offering SLI "support" (read: unlock codes) in the BIOS. I was originally going to use Cooler Master's Hyper 212 Evo CPU cooler, but in the course of overclocking I decided to swap it out for AMD's Asetek-built Bulldozer FX liquid cooler, which bears a very strong resemblance to Antec's Kühler 920 (also built by Asetek).

To keep things in the AMD house and at the $1,500 price point, my graphics card of choice is the Radeon HD 6970. It's got enough juice to power any game on the market at reasonable settings, and at $330 it fits well with my budget without being a budget card.

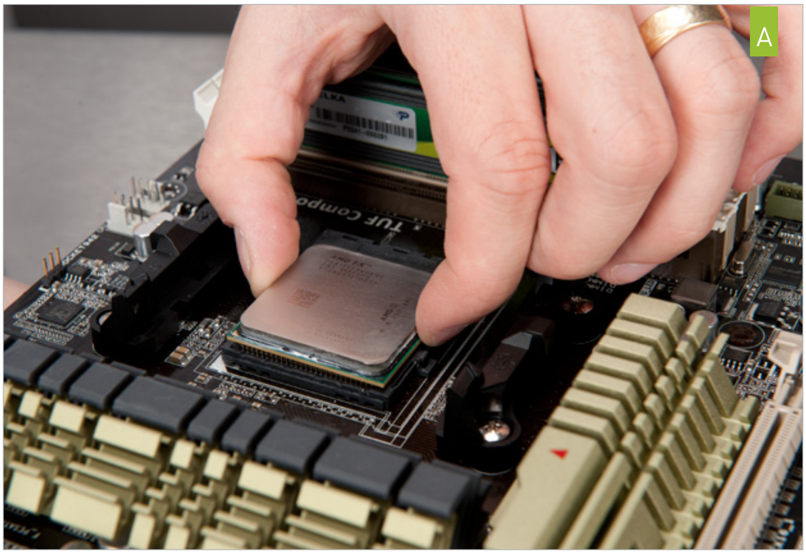
NZXT's just-launched Phantom 410 is a smaller version of the original Phantom, with a few more fans and USB 3.0 support. Corsair's TX750 v2 PSU is more than enough power for my overclocks and any extra graphics cards I want to add later.

The one wild card in my build is the hard drive. Thanks to the still-ongoing Thailand floods, the price of a 750GB 2.5-inch hybrid drive is (at press time) only a little more than a 1TB 3.5-inch drive. The 8GB of NAND cache on the Momentus XT gives a performance boost to my most frequently accessed sectors of the disk, so boot and oft-used programs will be faster.

ASSEMBLING THE HARDWARE

1 PREP THE BOARD

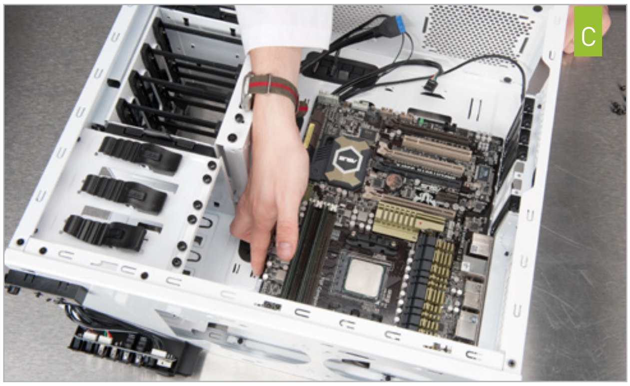
TO INSTALL THE CPU, lift the socket arm and gently lower the CPU into place, making sure the triangle on the CPU's corner is aligned with the correct corner in the socket **(image A)**. Lower the lever back into place. Install the RAM into the second and fourth slots (the tan ones).


A

2 PREP THE CASE AND INSTALL MOTHERBOARD

BEFORE WE START building into the case, it's time to move some fans. Remove the side, top, and front panels from the case, then remove the rear 12cm exhaust fan and top 14cm exhaust fan. This will involve unplugging them from their fan controller connectors behind the motherboard tray. Use the long screws provided to install the 12cm fan in the front of the case, directly above the existing intake fan (image B). Reconnect it to one of the fan control connectors behind the motherboard tray. Set aside the 14cm fan and its screws for now.

Install the motherboard standoffs in standard ATX configuration, put the motherboard I/O shield in place, then install the motherboard in the case (image C).



3 INSTALL THE CPU COOLER

IF YOU'RE getting flashbacks to last month, I don't blame you. AMD's Bulldozer-branded liquid-cooling system is built by Asetek, the same OEM that makes Intel's RST2011LC liquid cooler, and is, in fact, nearly identical to the Asetek-made Antec Kühler 920.

The instructions say to install the cooling fans as intakes, but we're going to use ours as exhaust. Attach one fan to the inside of the cooler, then attach the other through the exhaust fan mounts to the radiator (image D). Run the radiator fans' power cables behind the motherboard tray.

Assemble the cooler mounting bracket as shown in AMD's instructions and clip it to the CPU heatsink (image E). Unscrew the four screws attaching AMD's cooling mount to the backplate and remove the plastic mounts. Mount the CPU cooler/pump unit to the AMD backplate, tightening the mounting screws in an X-shaped pattern (image F). Attach the 3-pin pump power cable to the CPU_FAN header and run the radiator fan Y-connector behind the motherboard tray to the radiator fan cables (image G). Run the USB 2.0 cable behind the motherboard tray to the bottom of the motherboard and connect it to a USB 2.0 header.

Install the GPU in to the topmost x16 PCIe slot.

4 INSTALL THE DRIVES

REMOVE THE TOP optical drive bezel and replace the case's front panel. Slide the optical drive into that bay and secure it with the toolless mechanism. Add thumbscrews if you'd like. Take a hard drive tray from the cage and remove the mounting posts from the sides. Install the Momentus XT using the 2.5-inch mounting holes on the bottom of the tray **(image H)**. Replace in bay.

H

5 INSTALL THE PSU

INSTALL THE POWER supply into the case with the fan facing down. Bring the dual-4-pin ATX auxiliary power cable, 24-pin ATX power cable, and two 6-pin PCIe power cables through the cutout nearest the PSU to the back of the motherboard tray. Bring the auxiliary ATX power cable through the opening at the top of the motherboard tray and connect it **(image I)**. Bring the 24-pin motherboard power cable through the top side cutout and connect it, then connect the 6-pin PCIe connectors to the GPU—one will require the use of the 2-pin connector, as well.

I

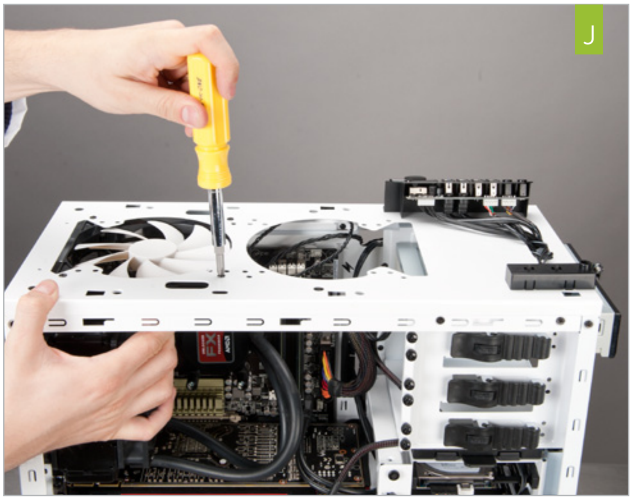
6 FINISH THE WIRING

REPLACE THE TOP 14cm fan, but flip it around so that it's used as an intake fan rather than exhaust. This will keep the motherboard voltage regulators under the radiator from overheating **(image J)**.

Connect the fan power lead to one of the fan controller connectors behind the motherboard tray.

Connect the front-panel connector power and LED switches to the board, as well as the HD Audio, USB 2.0, and USB 3.0 connectors. Connect SATA power and data cables to the optical and hard drives, then connect 6Gb/s SATA cables from the drives to the lowest set of SATA ports on the motherboard.

Use zip ties to tie excess fan controller connectors and case wiring to the rear of the motherboard tray **(image K)**. Bundle the unused power connectors here as well, if you can fit them.


J

K

7 WRAP IT UP

AT THIS POINT you should connect your monitor, mouse, and keyboard and turn on the rig. Enter the BIOS's Advanced Mode, go to Boot, and deselect "Wait for F1 on Error." This will prevent the system from hanging up due to a perceived fan-speed error from the pump. Exit out of the BIOS, and install Windows and your drivers as normal, making sure to install the ChillControl software for the CPU cooler.

Once Windows is set up and working, it's time to tweak the CPU a little bit. Bulldozer parts seem to vary in their overclocking stability: After many overly ambitious overclocks, I got to 4.2GHz, mostly by upping the CPU multiplier, but I've seen overclocks of over 4.8GHz with the same CPU and motherboard, so your mileage may vary.

1. If I were Asetek, I'd feel pretty good—both Intel and AMD recommend the OEM's coolers for their top-of-the-line chips.

2. AMD's Radeon HD 6970 is a great GPU for the price.

3. The NZXT Phantom 410 has a lot of hard drive trays, but I'm only using one.

4. Springing the extra $30 or so for a modular power supply can eliminate cable bunching at the bottom of the case.

MIDDLE-CLASS DREAMS ACHIEVED

GIVEN THAT GORDON had already benchmarked the FX-8150, I wasn't expecting miracles, and I didn't get them. The Bulldozer rig pulled down respectable scores for a $1,500 rig, but I didn't really see any benefit from eight cores at 4.2GHz that wasn't exceeded by a quad-core i7-920 at 3.5GHz. I was really surprised by both the difficulty of maintaining a stable overclock and the lack of oomph I got when I did manage to overclock.

After spending hours trying to stabilize my Bulldozer system at 4.8GHz and 4.6GHz, both of which I'd seen run on the same motherboard with the same processor, I had to lower my sights a little. I finally settled on a stable 4.2GHz—17 percent faster than stock. On CPU-bound benchmarks, though, like Vegas Pro and MainConcept Reference, I saw less than a 10 percent improvement over the FX-8150 at stock, and the other benchmarks showed even less improvement. FX-8150 chips seem to be variable in their tolerance for overclocks, so you might have better luck.

Of course, the lower scores on encoding tests could also have to do with my boot drive. I normally prefer to run with an SSD boot drive, but I went with a hybrid drive this time. The disk access speed and slower-than-solid-state write speeds doubtless affected the encoding tests, which all involve reading and writing large files to the disk.

That said, Bulldozer does offer better thermal performance. My FX-8150 never got above 55 C, even running Prime95 at 4.2GHz, which is a far lower temperature than we'd see from the overclocked i7-920 in our zero-point test bed.

If your budget allows for it, you may want to go for a multi-GPU setup. Unlike Sandy Bridge motherboards, which can run two x16 PCIe videocards but only at x8, the Sabretooth 990FX can run them at their full x16 speed. Does it really make a big difference? In the vast majority of cases, no, but hell, you can at least rub it in the noses of your friends running at x8 speeds.

For a $1,500 machine, the Bulldozer rig does offer a lot of performance, although unless you're running heavily multithreaded applications you probably won't notice the difference between its eight cores and a decent quad-core—especially if the quad has Hyper-Threading. At this point, diehard AMD fans will probably just be happy to hear that a Bulldozer-powered rig holds its own at its price point. A Bulldozer rig isn't the fastest money can buy, but for the price, you get a lot of cores, decent performance, and full PCIe lanes to grow into.

BENCHMARKS

	ZERO POINT	
Vegas Pro (sec)	3,049	3,203 (-5%)
Lightroom 2.6 (sec)	356	413 (-14%)
ProShow 4 (sec)	1,112	1,138 (-2%)
MainConcept 1.6 (sec)	2,113	2,207 (-4%)
STALKER: CoP (fps)	42.0	33.0 (-21%)
Far Cry 2 (fps)	114.4	98.3 (-14%)

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Our current desktop test bed consists of a quad-core 2.66GHz Core i7-920 overclocked to 3.5GHz, 6GB of Corsair DDR3/1333 overclocked to 1750MHz, on a Gigabyte X58 motherboard. We are running an ATI Radeon HD 5970 graphics card, a 160GB Intel X25-M SSD, and 64-bit Windows 7 Ultimate.

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TESTED. REVIEWED. VERDICTIZED.

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MAINGEAR SHIFT QUAD-SLI PC PAGE 74

Maingear Shift

Here's what real quad-SLI looks like

The Shift's over-the-top GPU configuration puts the machine over the top.

WHEN A NEW platform launches, we usually expect it to take half a year or more for new PCs to wrench every bit of performance from it. Yet here we are just three months into Sandy Bridge-E's lifespan, and system vendors are already at the edge of its performance.

The first thing you'll notice in the Maingear Shift is the 3.3GHz Core i7-3960X running at 4.7GHz, with some of the cores reaching 4.9GHz. Nice. The CPU isn't really the star here, though: It's the dual Asus Mars II cards. Each of these gigantic cards is the equivalent of two GeForce GTX 580s in SLI. Two of them make it quad-SLI. Sure, we've seen dual GeForce GTX 590s in quad SLI, but those cards are clocked way down from their two-slot designs due to thermal and power restraints. The Mars II cards are each *three* slots wide and built to overclock. How fast are they? That depends mostly on the benchmark, but this setup obviously isn't for someone running a mere 1080p panel.

Enough about the videocards; the rest of the system is damn nice, too. The Shift is top-of-the-line throughout, from the custom water-cooled CPU, to the Asus Rampage IV Extreme mobo, to the dual 240GB Corsair Force GT SSDs in RAID 0, to the custom-designed Aphex audio circuit. But while the system is set to 11 everywhere else, there's but 16GB of RAM, which seems almost quaint these days.

The case is a custom-built Silverstone that orients the videocards vertically to enhance airflow. The Rosso Red paint job is a head turner, but its smoothness and texture are not in the same class as the finish on Falcon Northwest's Mach V (reviewed last month).

The rig's performance, on the other hand, is pretty awesome. Digital Storm's Black Ops HailStorm (reviewed in the Holiday issue) recently set four new benchmark records. The Shift ties the HailStorm in our application testing, but manages to wrest record scores in our ProShow Producer 4 and Adobe Lightroom tests. Not by much, but it's still ahead. The Shift also set a record in Far Cry 2. Our gaming benchmarks really don't do the Shift justice, though. We've been running Unigine's Heaven 2.5 benchmark for a few months as an unofficial DX11 test, and the Shift walks away from all others in that test. The Falcon's SLI GTX 580 cards put out 42fps at max res and max settings. The Digital Storm's tri-SLI ups that to 50.8fps, and until now the best quad-SLI GeForce GTX 590 score has been 52.8fps. The Maingear Shift's score? 69.8fps. The Shift's score in 3DMark 7 on the Extreme setting is also through the roof: X7785. We've seen quad-SLI 590s with a score of X5994, and our Dream Machine's tri-SLI setup coughed up X5863, while the Falcon box gave us X4528. The upshot is that the Shift is fast, as long as you have games that'll push it.

Like everything else on the Shift, cost is also through the roof: The Shift makes the $7,400 HailStorm and $6,900 Falcon Mach V seem almost affordable. This box, with its limited-edition GPUs, Aphex audio, Rosso Red paint, and Sandy Bridge-E CPU, will set you back a cool $8,875. No, that's not a typo. Hell, the GPUs alone cost more than $3,000.

We'd cry bloody murder about Dream Machine–like pricing from a vendor were it not for the performance we're seeing—especially in DX11 titles—which makes us think we should just shut our piehole. So yeah, you'll need Warren Buffet–like wealth to afford it, but man, this sucker is screamin'. –**GORDON MAH UNG**

VERDICT 9 KICK ASS!

Maingear Shift

+ MAINFRAME Dual Mars II cards crush DX11 games.

− MAINSTREAM Slightly loud under load; priced for the .01 percent.

$8,876, www.maingear.com

BENCHMARKS

	ZERO POINT	
Vegas Pro (sec)	3,049	1,730
Lightroom 2.6 (sec)	356	230
ProShow 4 (sec)	1,112	739
MainConcept (sec)	2,113	1,295
STALKER: CoP (fps)	42.0	124.4 (+196%)
Far Cry 2 (fps)	114.4	220.9

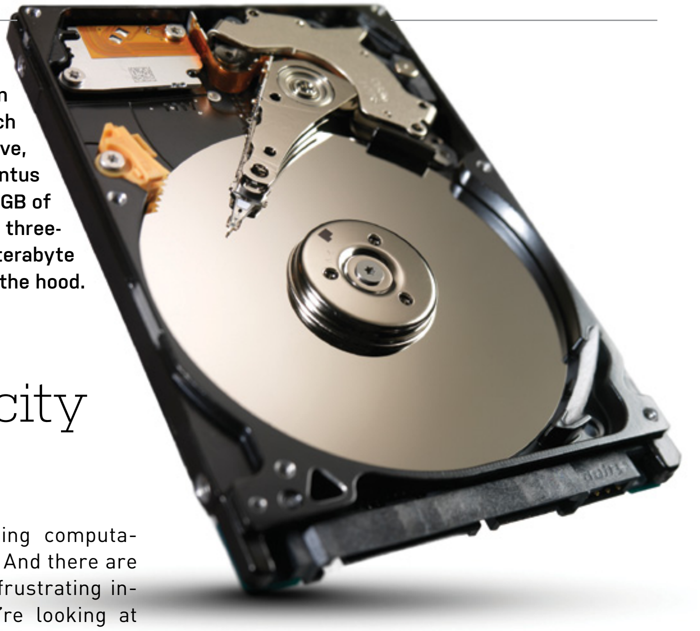
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Our current desktop test bed consists of a quad-core 2.66GHz Core i7-920 overclocked to 3.5GHz, 6GB of Corsair DDR3/1333 overclocked to 1,750MHz, on a Gigabyte X58 motherboard. We are running an ATI Radeon HD 5970 graphics card, a 160GB Intel X25-M SSD, and the 64-bit version of Windows 7 Ultimate.

SPECIFICATIONS

Processor	Intel 3.3GHz Core i7-3960X OC'd to 4.7GHz
Mobo	Asus Rampage IV Extreme using Intel X79 chipset
RAM	16GB Corsair DDR3/1866
Videocard	Two Asus Mars II in quad-SLI
Soundcard	Onboard with EPIC Audio Engine
Storage	240GB Corsair Force GT, 3TB Seagate 7,200rpm HDD
Optical	LG Blu-ray combo drive
Case/PSU	Maingear Shift chassis/ Silverstone Strider Gold 1,500 Watt

Seagate Momentus XT 750GB



It might look like an ordinary 2.5-inch mechanical drive, but the Momentus XT is packing 8GB of NAND cache and three-quarters of a terabyte under the hood.

The hybrid drive gets a capacity boost and more NAND cache

IN THE STORAGE WORLD, nothing matches a solid-state drive for speed, and nothing matches a mechanical hard drive for capacity and price per gigabyte. Recognizing that these two great tastes would go great together, many vendors have attempted to find the perfect hybrid storage solution, with variable—and often clunky—results. Seagate's Momentus XT, which we first reviewed in September 2010, offered a 500GB 2.5-inch drive with 4GB of NAND flash and an adaptive algorithm to ensure that the most frequently used files are mirrored in the NAND. This means your boot drive feels faster than a mechanical drive, if only for the stuff you use the most. We liked the first Momentus, but complained that it could use more NAND. Seagate aims to address that complaint with this new Momentus.

The Momentus XT ups the mechanical portion of the drive to 750GB, while doubling the NAND cache to 8GB. The SATA controller is now 6Gb/s, the industry standard for all new drives. Unlike other hybrid solutions, the onboard controller performs the entire caching computation, so there's no CPU hit. And there are no weird driver issues or frustrating installation procedures—we're looking at you, OCZ RevoDrive Hybrid (reviewed on page 84). Seagate's adaptive memory algorithm simply moves the most-accessed LBAs to the NAND cache.

On the raw disk level, the Momentus XT 750GB is identical to a standard Momentus 750GB drive, as borne out by low-level benchmarks like HDTune. The adaptive algorithm shows its worth in real-world benchmarks and tests, such as PCMark Vantage's HDD subtest and PCMark 7's secondary storage suite. As we ran PCMark Vantage multiple times, the algorithm copied the most frequently accessed LBAs to the NAND, bringing the HDD subscore from a first run of 5,471 to a stable score of 14,759. That number is three times higher than what the standard Momentus is capable of, but it doesn't come close to the 52,000-plus score that a second-gen SandForce drive can rack up. In the more modern PCMark 7, scores stabilized around 3,295—almost double that of the standard mechanical drive, but nowhere near the 5,070 of the SSD. When we installed Windows on the drive, our system stabilized at a boot time of around 25 seconds—just a few seconds slower than a SandForce-powered SSD, and a solid 13 seconds faster than the vanilla Momentus.

The ongoing hard drive shortage makes prices on existing drives, and thus the Momentus XT's value proposition, difficult to determine. At press time, the 750GB Momentus XT's MSRP of $245 makes for a $95 premium over the street price for existing stocks of the first-gen 500GB Momentus XT, or the vanilla 750GB Momentus, but those existing stocks could run out any time. A 120GB SSD would presumably cost about the same as the 750GB Momentus XT, but would deliver just a fraction of the latter's capacity.

The 750GB Momentus XT offers a solid speed boost in real-world applications that you use frequently, compared to a regular mechanical drive. Its updated capacity, 6Gb/s SATA controller, and 8GB of NAND are much appreciated. If you don't want to deal with clumsy multi-drive hybrid solutions or shell out for a tiny SSD, the Momentus XT offers an easier, better way to get both capacity and speed. –NATHAN EDWARDS

BENCHMARKS

	Momentus XT 750GB	Momentus 750GB	Corsair Force GT 120GB
Premiere Pro encode (sec)	470	503	**435**
PCMark Vantage	14,759	4,338	**52,837**
PCMark 7 Secondary Storage Suite	3,295	1,705	**5,070**
Win7 boot time (sec)	**25**	38	**24**
HDTune 4.01			
Avg. read (MB/s)	91.3	91.2	N/A
Random-access read (ms)	15.7	15.3	N/A
Avg. write (MB/s)	89.1	88.7	N/A
Random-access write (ms)	**2.2**	15.3	N/A

Best scores are bolded. Our current test bed is a 3.1GHz Core i3-2100 processor on an Asus P8 P67 Pro (B3 chipset) running Windows 7 Professional 64-bit. All tests used onboard 6Gb/s SATA ports with the latest Intel RST drivers.

VERDICT 9

Seagate Momentus XT 750GB

+ MOMENTOUS Significantly faster than a conventional mechanical HD; significantly more storage capacity than an SSD.

− MEANINGLESS Not as fast as an SSD; less storage capacity than a conventional mechanical HD.

$245, www.seagate.com

EVGA GeForce GTX 580 Classified

Frame buffer maximus

EVGA'S GTX 580 Classified is not a pretty videocard. The bulging air intake on top of the fan's matte-black cowl looks like the hood scoop on a primered 1970s muscle car. The Classified requires three PCIe power connectors (two 8-pin plus one 6-pin). And buying one will drain a cool $600 from your bank account. What do you get for your six bills? A GTX 580 punched up to a core clock rate of 855MHz, and the bragging rights that come with owning a card with a 3GB frame buffer.

We say bragging rights because one such massive frame buffer doesn't deliver significant benefits with games, even when you crank up the resolution to 2560x1600 to obtain the full benefit of your 30-inch display. Where it does come in handy is when you run two such monsters in SLI, so you can pump anti-aliasing up to 8x multisampling and enable maximum PhysX effects. This is a no-compromises card that requires no-compromises configurations.

Still, even a single GPU, when pushed as hard as the one on this card, can deliver impressive frame rates. We compared it to EVGA's GTX 580 SC, which is overclocked to a slightly less-nutty 797MHz, but bears a price tag that's $50 lower. And just for grins, we also took a fresh look at XFX's take on the Radeon HD 6970. The latter isn't really a fair fight; but then, XFX's card costs just $350.

Despite needing three power connectors, the Classified's overall power draw doesn't strike us as excessive. We measured system power consumption of 385 watts under load. When the system was idle, system power consumption with the Classified was identical to that of the GTX 580 SC (140 watts), despite the former card's extra 1.5GB of onboard memory. If you decide to run two of these bad boys in SLI, though, you'll want to do it with a kilowatt PSU with high current delivery.

As for benchmarks, the GTX 580 Classified wins. Everything. There's no contest, although on most counts, the performance delta between the $600 card and the $550 card is only a few frames per second. The Classified gets noisy under severe gaming loads, but only marginally more so than the lesser GeForce card.

When you get right down to it, you don't need a videocard with a GPU overclocked this far any more than you need a videocard with a 3GB frame buffer. But the GeForce GTX 580 Classified isn't about need; it's about craving—craving the ultimate badass air-cooled graphics card. If that's your heart's desire, EVGA will happily fulfill it. **–Loyd Case**

BENCHMARKS

	EVGA GeForce GTX 580 Classified	EVGA GeForce GTX 580 SC	XFX Radeon HD 6970
3DMark 2011 Perf	**7,321**	6,747	5,750
3DMark Vantage Perf	**28,559**	26,936	24,453
Unigine Heaven 2.5 (fps)	**36**	34	24
Shogun 2 (fps)	**38**	35	31
Far Cry 2 / Long (fps)	**132**	125	106
HAWX 2 DX11 (fps)	**188**	177	103
STALKER: CoP DX11 (fps)	**47**	44	39
Just Cause 2 (fps)	**60**	58	45
Batman: Arkham City (fps)	**57**	53	43
Metro 2033 (fps)	**28**	26	23
DiRT3 (fps)	**80**	74	63
System Power @ idle (W)	140	140	**126**
System Power @ full throttle (W)	385	344	**296**

Best scores are bolded. Our test bed is a 3.33GHz Core i7 3960X Extreme Edition in an Asus P979X Deluxe motherboard with 16GB of Corsair DDR3/1600 and an AX1200 Corsair PSU. The OS is 64-bit Windows Ultimate. All games are run at 1920x1200 with 4x AA unless otherwise noted.

VERDICT 9 KICK ASS!

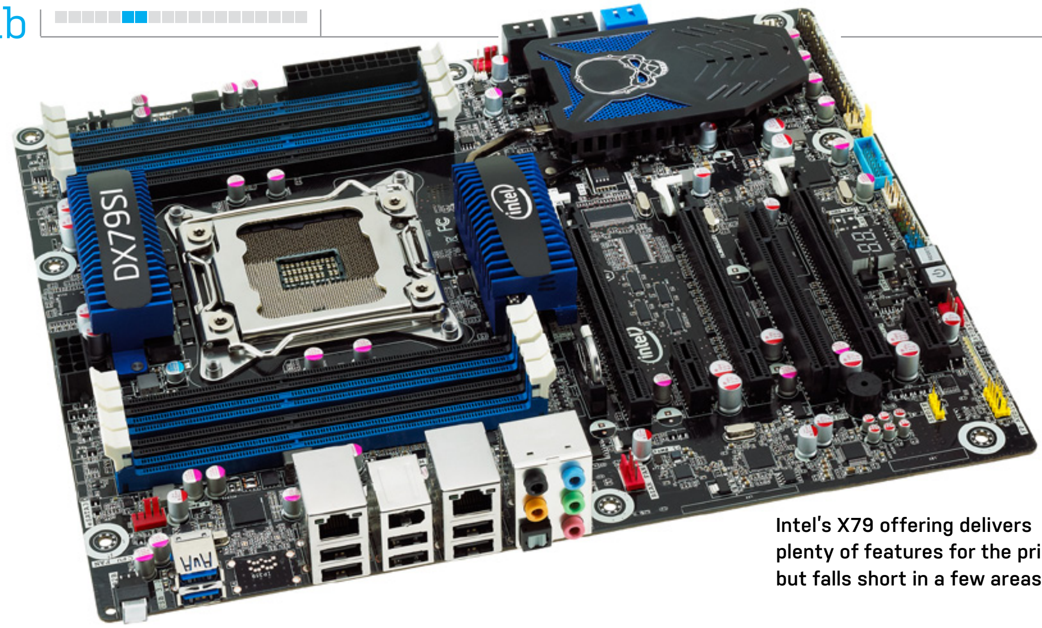
EVGA GeForce GTX 580 Classified

+ ARBELOUR Superb performance; 3GB frame buffer.

– LOC DHU Just a little noisy under load.

$600, www.evga.com

If you're looking to go even further over the top than the Classified, you might consider something in EVGA's Hydro Copper line; but then you'll need a liquid-cooling apparatus.



Intel's X79 offering delivers plenty of features for the price, but falls short in a few areas.

Sandy Bridge-E Motherboard Mambo

Two new dance partners for Intel's latest CPU

Being an enthusiast isn't easy on the pocketbook, but Intel's new Sandy Bridge-E at least makes your CPU-buying decision easy. After all, if you want six cores, tons of PCIe 3.0 lanes, and quad-core RAM, no Z68 motherboard or milksop Sandy Bridge chip will satisfy your needs. But what to run your shiny new SNB-E in? We compare and contrast two hot new boards to see if they're up to snuff for your hexa-core processor. –GORDON MAH UNG

INTEL DX79SI EXTREME SERIES

Intel makes motherboards, too?

That's likely the reaction you'll get from someone perusing a list of potential motherboards. Yes, Virginia—and North Carolina—Intel makes motherboards and has been making them for a long time. The other question that many ask is, why does Intel bother to play in the dog-eat-dog enthusiast mobo game?

We've wondered that ourselves in the past, as no one in the company's board division seemed to understand what enthusiasts crave. That has greatly changed over the years, although we still perceive some passive-aggressiveness embedded in Intel's motherboards.

In the DX79SI Extreme reviewed here, for example, Intel doesn't cheap out and goes the route of an eight-DIMM configuration, which we obviously favor over four-DIMM designs because of the upgrade potential it offers. Yeah, you might think you'll never need more than the 16GB of memory you'll get with a four-DIMM board, but that's not how the upgrading gods operate. Buy a four-DIMM board, and DDR3 prices will plunge 75 percent the very next week, or your favorite uncle will gift you another 16GB, and then the hand-wringing will begin.

Like its predecessor, the DX58SO2, the DX79SI features surface-mounted switches for power-on and reset, but Intel has deleted the ability to push bclock at the touch of a button. That's OK, as heavy bclock overclocking on the Sandy Bridge-E won't get you the highest yields. (Multiplier or Turbo overclocks will.)

As we said, Intel has paid a lot more attention to the needs of enthusiasts in the last few board revisions, so this board features CrossFireX, SLI, and tri-SLI support out of the box. That's good. What's bad is the placement of the x16 slots. The most common multi-GPU slot configuration will put both GPUs next to each other, which will leave one card impeding airflow to the other. On most enthusiast boards, such as the Gigabyte GA-X79-UD5, the two full x16 data-rate slots have a gap between them to aid GPU cooling. Intel could have gotten around this problem without changing the board's design, had it included a flexible SLI bridge so you could install the second videocard wherever you wanted. The rigid bridge Intel provides leaves you stuck. We must also ding the DX79SI for its pitiful number of SATA connectors (just six), and the *un*enthusiast number of USB 3.0 and USB 2.0 ports it provides—two and six, respectively.

The board does have a few nifty features, including the "back to BIOS" button on the I/O panel that, once pushed, will take you directly into the BIOS on your next reboot. The BIOS itself is cool, too, if you miss that retro 1990s line-based computing look (and some of us do). Despite its line-based interface, the BIOS is all-modern UEFI underneath. There's also a handy set of LEDs that let you see at a glance (provided you have 20/10 vision) what the board is hanging up on.

When we compared the DX79SI's performance to that of the Asus P9X79 Deluxe board we reviewed in the January issue, it seemed slow. But now that we've reviewed three X79 specimens, we've concluded that the Asus board is just particularly fast, as the Intel and Gigabyte boards are just about on par in performance. Why? We attribute most of that to BIOS updates which can be unsettled during new launches.

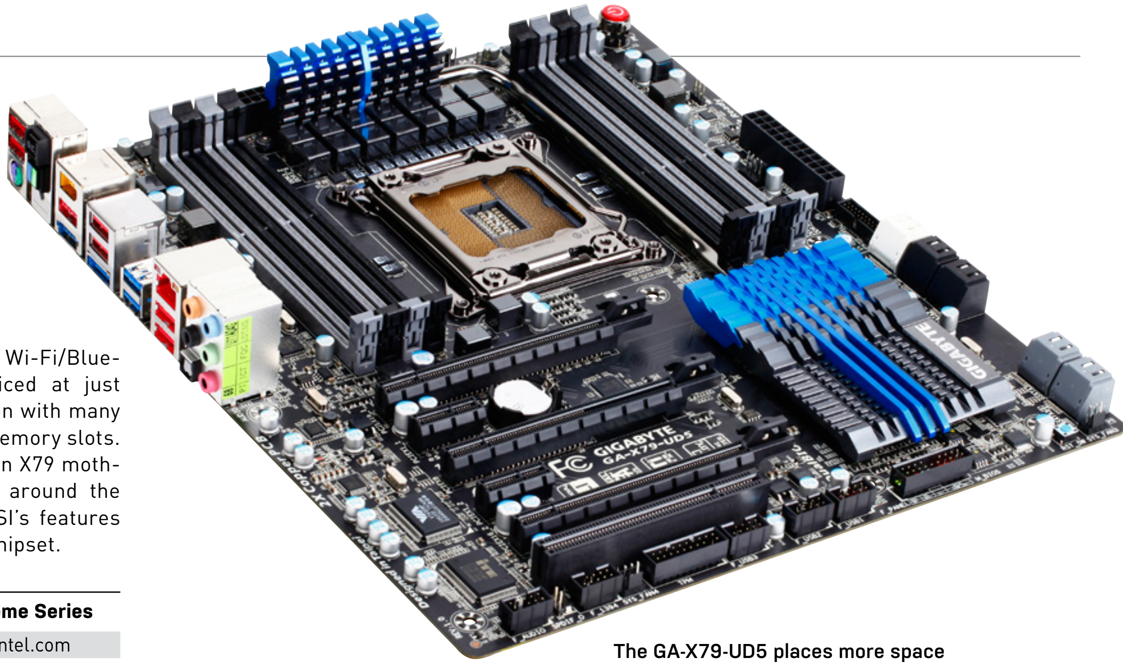
One area where we can't find fault with the DX79SI is the price tag. The board—

which comes with a bundled Wi-Fi/Bluetooth adapter—is street-priced at just $280, putting it in competition with many boards that offer only four memory slots. While that's a fair price for an X79 motherboard, there's no getting around the fact that many of the DX79SI's features fail to rise to the level of its chipset.

VERDICT 7

Intel DX79SI Extreme Series

$280 (street), www.intel.com



The GA-X79-UD5 places more space between GPUs in an SLI setup, and it gives you more ports than Intel's board.

GIGABYTE GA-X79-UD5

Of the big board vendors, Gigabyte is often dinged for taking too long to get on the UEFI train. It didn't help when the company's "touch-enabled" BIOS proved to be more gimmick than useful.

Gigabyte went back to the drawing board with the GA-X79-UD5, and the company's engineers have come up with a UEFI BIOS interface that's actually useful for BIOS newbs. Boot the board into the BIOS, and you're given an orthogonal view of the motherboard with full mouse control. Hover the cursor over certain components, such as the SATA ports or DIMM slots, and the part lights up. Click it, and you're taken to the appropriate BIOS setting. Yeah, it's not very handy for those schooled in BIOS interfaces, but Gigabyte's intent is to encourage those who wouldn't normally poke around a BIOS to be more comfortable with fine-tuning their rig. Old salts need not worry, though, Gigabyte also provides a more typical advanced BIOS.

The GA-X79-UD5 itself is a pretty full-featured board. Like Intel's DX79SI, it supports CrossFireX, SLI, and tri-SLI, and there's even a single PCI slot for old-schoolers. In a two-card SLI configuration (the most common), the single PCI slot will be covered up, as will one of the x1 PCIe slots. This arrangement, however, delivers plenty of airflow between those super-hot GPUs.

The Intel DX79SI outguns the UD5 in onboard indicators, with features such as Intel's handy multi-LED POST tool, but the UD5 delivers payback in terms of its SATA and USB connectors. With 10 SATA connectors and 10 USB connectors (four of them USB 3.0), the Gigabyte board puts the Intel board to I/O shame. Like the Intel board, there's also some back I/O-panel action, with a CMOS reset button, a dual-BIOS switch, and an OC button. Gigabyte also includes a PCIe-based 802.11n Bluetooth 4.0 card. For folks not in the know, Bluetooth 4.0 includes low-power profiles that might one day unify all those embedded low-power gadgets. For instance, you might come home from a jog (to the electronics store, natch), and your PC could download telemetry from the Bluetooth device embedded in your shoes.

Gigabyte's choice of USB 3.0 controller is also of interest. The UD5 is the first board we've seen that uses Fresco Logic's part, so we ran some benchmarks to check for any performance boost over USB 3.0 controllers from NEC, ASMedia, and Etron. We didn't see any, but a more thorough sit-down with USB 3.0 is warranted.

Our main issue with Gigabyte's board is that the Asus P9X79 we reviewed in the January issue outran it in a couple of our performance metrics. The UD5 is about on par with Intel's DX79SI, but the Asus is the best of the three. Will future BIOS updates eventually even everything out? Probably.

The best news is that the GA-X79-UD5 is almost affordable—for an X79 board, that is. While the Asus board is about four bills, the UD5 can be found for about $330 on the street. That's really not so much more than Intel's board, which we don't think provides enough SATA or USB ports.

VERDICT 9

Gigabyte GA-X79-UD5

$350, www.gigabyte.com

BENCHMARKS

	Intel DX79SI	Gigabyte GA-X79-UD5	Asus P9X79 Deluxe
PCMark 7 Overall	3,489	3,373	**3,662**
Valve Particle (fps)	260	259	**299**
SiSoft Sandra (GB/s)	38.9	39.4	39.9
SATA 6Gb/s read (MB/s)	499.9	501.2	**508**
SATA 6Gb/s write (MB/s)	**252.2**	234.7	224
USB 3.0 read (MB/s)	**202.3**	197.6	198
USB 3.0 write (MB/s)	168.5	**177.7**	175
SLI compliance	Yes	Yes	Yes
32GB compliance	Yes	Yes	Yes

Best scores are bolded. We tested all boards with a 3.3GHz Core i7-3960X, 16GB of DDR3/1600, 150GB Western Digital Raptor, GeForce GTX 580, and 64-bit Windows 7 Professional SP1. Performance scores for the SATA 6Gb/s and USB 3.0 were attained by using CrystalDiskMark 3 run against an OCZ Enyo USB 3.0 drive and an OWC Mercury Extreme Pro SSD.

The P280 offers a spacious interior with all the modern amenities.

The fan controller inside the rear of the case can power four two-speed fans.

The P280's front door doesn't, for once, hide the power and reset switches; Antec's engineers moved them up where they belong.

Antec P280

Classical variation

FROM AFAR, there's little to distinguish the Antec P280 from such long-in-the-tooth predecessors as Antec's P183. The steel side panels are all black, without mounting holes for additional fans or windows to provide a look inside. There's no LED glow, either. The only exterior visual clues that reveal this to be an entirely new chassis are the front-panel connections, including two USB 3.0 connectors with an internal header, which are located above the case's front door.

Remove the sound-dampening side panels, and you begin to discover just how modern the P280 is. Measuring 22.6 inches high, 11.4 inches wide, 24.8 inches deep, and weighing 26.5 pounds, this steel chassis is one of the most spacious we've built into this year. Unlike the P183 and its ilk, which kept the motherboard and PSU in separate compartments, the wide-open P280 supports motherboard form factors as large as XL-ATX. The cavernous interior is painted matte black, and the motherboard tray is endowed with one of the biggest CPU backplane cutouts we've ever seen. It also contains four cable-routing cutouts with rubber grommets, and an oversize cutout for an 8-pin auxiliary ATX power cable.

Unlike Antec's previous P-series chassis, the P280 doesn't contain a removable hard drive cage. But this didn't prevent us from installing even extremely long videocards without needing to move anything else inside the case. Each of the case's six hard drive bays slide right out, and the drives are secured from beneath through thick silicone gaskets that eliminate noise and vibration. Thumbscrews secure each of the nine PCIe slot covers, and each of the three optical drive bays is outfitted with a plastic latch. Two 2.5-inch drive bays at the top of the hard drive cage can harbor SSDs.

Antec ships the P280 with three 12cm exhaust fans, two on top and one in the rear. We connected them to the handy fan controller that's built right into the case, plugging each fan into the controller, and then powering the fan controller with a single 4-pin Molex connector from our power supply. The controller can set each fan to spin at either low or high speed.

If you want more cooling, the P280 can accommodate two 12cm intake fans in the front, and there are two sets of clips for 12cm fans on the hard drive cage. You'll want to use them if your hardware puts out any heat. When we ran our test bed (an overclocked Core i5-750 and a GeForce GTX 590) at full load, CPU temperatures hovered around 70 C—a full 10 C hotter than the same parts running inside a Corsair 800D.

Antec's P280 is a modern rendition of an old classic. It's spacious, elegant, and a joy to build into. It could use a few more stock fans, but its classic looks, quiet performance, and roomy insides make this a good choice for builders with refined taste. **–Alan Fackler**

VERDICT 8

Antec P280

SIMPLE Plenty of space to build; spacious cutouts; modern, yet classic.

PIMPLE Ho-hum stock cooling; rubber grommets fall out too easily.

$140, www.antec.com

Not pictured: tons of slide-out dust filters. We like.

EVGA GeForce GTX 560 Ti 448 FTW

The not-quite GTX 570

The two-slot GeForce GTX 560 Ti 448 FTW is outfitted with two dual-link DVIs and one each HDMI and DisplayPort on its mounting bracket.

WHEN IS A GTX 560 Ti not really a GTX 560 Ti? When it's almost a GTX 570.

Nvidia's latest GPU, the GTX 560 Ti 448 is really a GTX 580 (originally dubbed the GF110) with two functional blocks disabled, reducing its CUDA Core count from 512 to 448. The GTX 570 is a GF110 with one functional block disabled, endowing it with 480 CUDA Cores. The original GTX 560 Ti is a completely different chip, with different power requirements, but all 384 of its cores are fully functional.

Priced at $290, the 560 Ti 448 fills a price gap between the $250 GTX 560 Ti and the $350 GTX 570. Given that yields for GF110 GPUs have improved, the Ti 448 is a limited-edition version, so it's unclear how long it will remain on the market. And since we're approaching the end of a GPU generation, it's likely that many of the processors around today will soon ride off into the sunset. If you really want a GTX 570, but can't swing the price, the 560 Ti 448 might fill the bill. Like most of the retail cards based on this chip, EVGA's GTX 560 Ti 448 is factory overclocked, to 797MHz. Compare that to the typical GTX 570 design—Asus's ENGTX570, for instance—in which the GPU runs at a stock clock of 742MHz. We also compared EVGA's card to a couple of other factory-overclocked SKUs; namely, the Asus GTX 560 Ti DirectCU II, and the MSI Radeon HD 6950 Twin Frozr III.

The GTX 570 pulls slightly ahead of the pack in apps that make heavy use of shader programs (that's Just Cause 2 and the Unigine Heaven 2.5 synthetic benchmark in our suite). In most other benchmarks, it's either a wash, or the GTX 560 Ti 448 posts a slight lead. MSI's implementation of AMD's Radeon HD 6950 keeps up in some benchmarks (Shogun 2, STALKER: CoP, and Metro 2033), but it falls behind cards based on Nvidia's GF110 in the other tests. On the other hand, the Asus GTX 560 Ti trails the field in nearly all the benchmarks, edging out the HD 6950 in just a couple (Just Cause 2 and HAWX 2). Note: We've made some minor changes to both our test bed and our game benchmarks; so don't compare these performance numbers to our earlier reviews.

So this card is cheaper than the GTX 570, but it still costs nearly $300. Note also that our GTX 570 isn't a factory-overclocked version; most current versions shipping deliver higher clock speeds, so the performance gap between the EVGA GTX 560 Ti and those GTX 570 cards will likely be wider.

The GTX 560 Ti 448 is also about the same size as other GTX 560 Ti cards, which means it will fit in more compact cases. So if you're looking for a little more performance juice in that small form factor gaming rig, EVGA's Ti 448 FTW is definitely worth considering. –LOYD CASE

BENCHMARKS

	EVGA GTX 560 Ti 448	Asus GTX 560 Ti DirectCU II	Asus GTX 570	MSI Radeon HD 6950 Twin Frozr III
3DMark 2011 Perf	**6,153**	4,799	5,987	5,412
3DMark Vantage Perf	**24,434**	20,925	**24,432**	22,897
Unigine Heaven 2.5 (fps)	20	19	**22**	18
Shogun 2 / 1080p (fps)	45	37	44	**48**
Far Cry 2 / Long (fps)	**111**	97	108	102
HAWX 2 DX11 (fps)	**155**	127	152	101
STALKER: CoP DX11 (fps)	**37**	31	**37**	36
Just Cause 2 (fps)	51	46	**52**	43
Batman: Arkham City (fps)	**47**	34	46	43
Metro 2033 (fps)	22	16	22	22
System power @ idle (W)	133	**125**	130	126
System power @ full throttle (W)	361	**270**	304	273

Best scores are bolded. Our test bed is a 3.33GHz Core i7 3960X Extreme Edition in an Asus P979X Deluxe motherboard with 16GB of Corsair DDR3/1600 and an AX1200 Corsair PSU. The OS is 64-bit Windows Ultimate. All games are run at 1920x1200 with 4x AA unless otherwise noted.

VERDICT 8

EVGA GeForce GTX 560 Ti 448 FTW

+ **HIT GIRL** Nearly as fast as a GTX 570; bigger frame buffer; tri-SLI capable.

− **QUEEN AMIDALA** Almost $300; may have a short lifespan.

$290, www.evga.com

OCZ RevoDrive Hybrid 1TB

An end to manual SSD data organization?

YOU MIGHT have noticed that hybrid storage solutions—which meld the speed of solid-state with the capacity of mechanical models—have been gaining traction in the marketplace. If Seagate's Momentus XT (reviewed on page 75) is a sane way to do that, OCZ's RevoDrive Hybrid is a mad scientist's contraption: a x4 PCIe card with 100GB of NAND and a 1TB 5,400rpm drive Frankensteined together.

The RevoDrive Hybrid is superficially similar to the RevoDrive 3 X2 we reviewed in December 2011 (read our take at bit.ly/sG2n8v). Like that drive, it consists of a PCIe card with a custom OCZ Superscale SCSI controller governing a number of SandForce SF-2281 controllers and some amount of 25nm NAND. The RevoDrive X3 had four SF-2281 controllers, controlling 480GB of NAND spread over the PCB and a riser card. The Hybrid has two SF-2281 controllers with 128GB of NAND, and the riser card supports a 1TB Toshiba 5,400rpm drive on a standard SATA bus. The SSD is used as a cache to mirror the most frequently accessed data, while the 1TB drive stores everything else. Because caching involves lots of write cycles, 23 percent of the NAND is dedicated to overprovisioning, so the volume only shows up as 100GB.

The RevoDrive Hybrid installs into any PCIe slot that's at least x4. The fat hard drive juts a bit into the next slot's space, so you won't be able to install right next to a videocard. The Hybrid requires F6 drivers and works only if Windows is installed to the onboard 1TB drive, not to the 100GB SSD partition or any other drive. You must ensure that your Windows installation media isn't booting as a UEFI drive, or it'll install Windows on a GPT partition, which isn't compatible with the Dataplex software OCZ uses for caching—a fact not documented in the Hybrid's manual. Once Windows is installed, though, and Dataplex is configured to use the 100GB SSD as a cache for the larger drive, caching works seamlessly.

We used the same test bed, system image, and benchmarks to test the RevoDrive Hybrid against a 120GB SandForce 2281-powered drive and Seagate's second-gen Momentus XT. We ran each test three times on each platform to allow data to cache. By the third run, the RevoDrive Hybrid performed nearly on par with the SSD, proving that the caching was working as advertised. The SSD still outperformed the Hybrid in PCMark's storage tests, as well as in CrystalDiskMark and our Premiere Pro encoding test, but the Hybrid wasn't far behind.

You won't see SSD-class performance across the whole drive, of course; you're stuck with 5,400rpm mechanical drive performance when accessing data you almost never retrieve. But that's the same deal you'll get with any caching solution.

Is the RevoDrive Hybrid for you? Installing and configuring it can be a pain. It takes up two PCIe slots, and it gets quite warm when running. Even with hard drive prices high (as they are at the time of this writing), the RevoDrive Hybrid commands a $100 price premium over buying a 120GB SSD and a 1TB desktop hard drive. Anyone using a motherboard with a Z68 chipset, meanwhile, has a strong incentive to simply use Intel's built-in SRT caching.

Having said that, we think the Hybrid makes a strong case for itself. It doesn't consume any SATA ports, and it offers intelligent, set-it-and-forget-it caching that provides great speed boosts to the data you use most frequently without the need for manual data organization. It's not perfect—it's a hassle to install, and its $500 price tag borders on ludicrous—but it's a good solution. **–Nathan Edwards**

BENCHMARKS

	OCZ RevoDrive Hybrid	Corsair Force GT 120GB	Seagate Momentus XT 2nd Gen
Windows Boot Time - Rebooter & BootRacer (sec)	21	**11**	17
PCMark 7 (PCMark & Primary Storage)	3,810	**3,990**	3,634
PCMark Vantage (storage)	40,934	**43,625**	12,824
SYSmark 2012 - Office Productivity	130	**131**	122
SYSmark 2012 - Media Creation	**128**	127	122
Premiere Pro Encoding (sec)	464	**435**	492
CrystalDiskMark Sust Reads (MB/s)	390.2	**479.4**	111.8
CDM Sust Writes (MB/s)	**155.1**	137.7	105.2

Best scores are bolded. Our test bed is a 3.33GHz Core i7 3960X Extreme Edition in an Asus P979X Deluxe motherboard with 16GB of Corsair DDR3/1600 and an AX1200 Corsair PSU. The OS is 64-bit Windows Ultimate. All games are run at 1920x1200 with 4x AA unless otherwise noted.

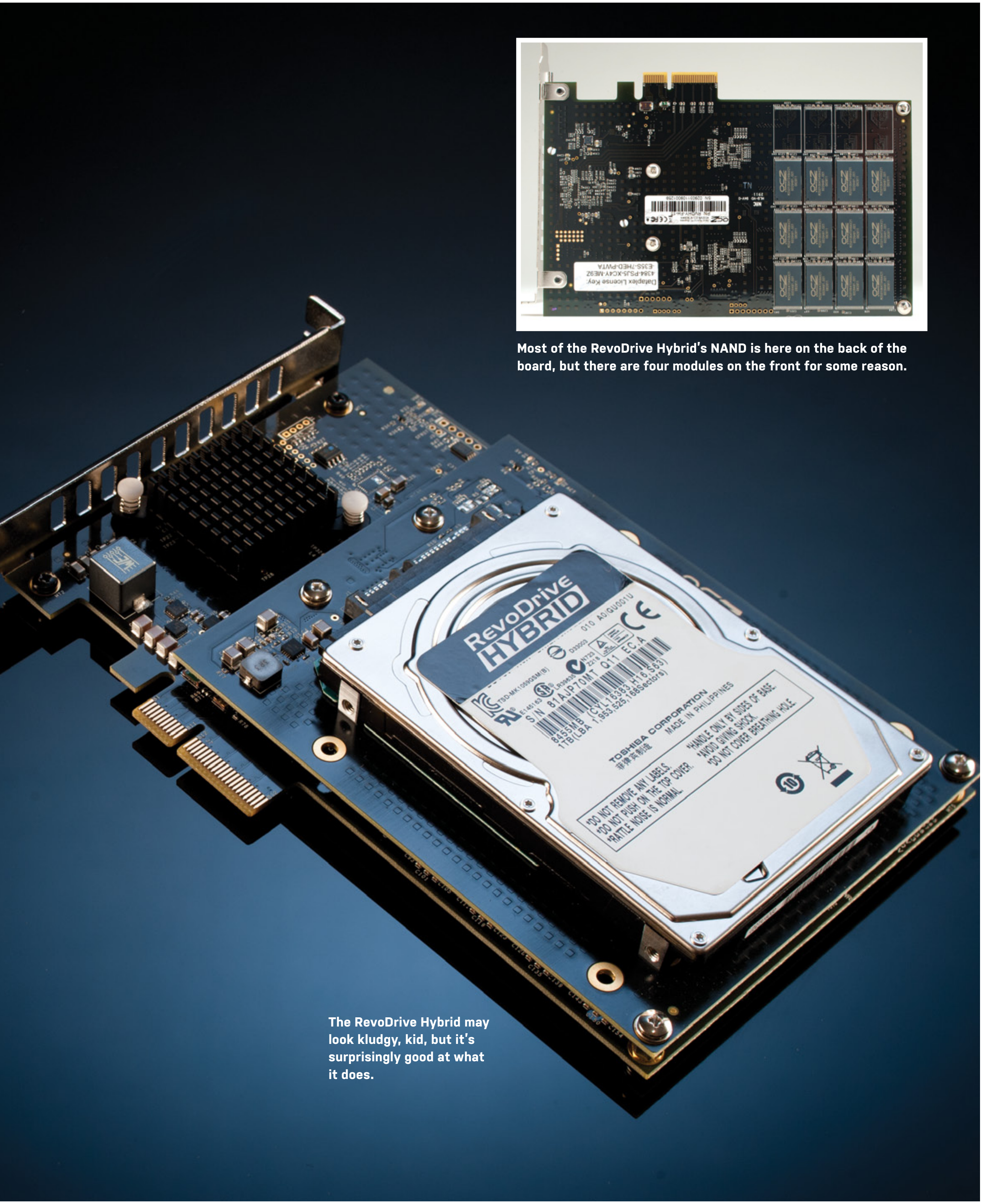
VERDICT 8

OCZ RevoDrive Hybrid

➕ **BLACKREACH** Fast, intelligent caching; plenty of room; no manual data organization.

➖ **BLACKWATER** Runs warm; finicky install; insufficient documentation.

$500, www.ocztechnology.com



Most of the RevoDrive Hybrid's NAND is here on the back of the board, but there are four modules on the front for some reason.

The RevoDrive Hybrid may look kludgy, kid, but it's surprisingly good at what it does.

Battle of the 30-inch Beasts

Professional monitors from Dell and NEC go toe-to-toe

NEC's PA301W won the honor of accompanying our 2011 Dream Machine.

Dell's U3011 strikes a good balance between price, performance, and features.

Comparing these two professional-grade 30-inch displays is a little like comparing 18- and 22-karat gold. They're both high-end IPS monitors aimed at users who depend on visual accuracy for their livelihood, and each one scored very high on our benchmark tests. But the Dell U3011 delivers an exceptional price/performance ratio at $1,500; can the $2,300 NEC PA301W justify an $800 price bump? Well, we didn't choose it for our budget-be-damned 2011 Dream Machine for nothing. –AMBER BOUMAN

DELL U3011

Dell's 30-inch U3011 features an anti-glare hard coat to reduce reflections, and the 2560x1600 display tilts, swivels, and is height adjustable, but it can't pivot into portrait mode. The monitor is outfitted with two HDMI and two DVI ports, as well as one analog VGA and one DisplayPort input. USB hubs are always convenient, and Dell obliges with one upstream and four downstream USB 2.0 ports, along with a seven-in-one multi-card reader in the side of its bezel.

The U3011 turned in a solid performance as we ran it through our gauntlet of DisplayMate (www.displaymate.com) benchmarks, producing some of the crispest text we've seen in tests that examine font clarity and readability. The monitor also did well on pixel-tracking tests that expose digital noise, and it produced stellar results in color-ramp tests that evaluate the display's ability to produce smooth color gradations.

Dell's monitor performed slightly better than NEC's in the ringing and overshoot tests, but we did detect a small amount of moiré when we watched the Blu-ray version of *V for Vendetta*. The U3011 exhibited a small amount of noise in suits, faces, and background signs. This, and the fact that the monitor can't swivel to portrait mode, are enough to deny it a Kick Ass award. We didn't encounter any issues or flaws while playing games, though. All in all, Dell has produced a fine display with a very reasonable price tag.

VERDICT 9

Dell U3011

➕ **MONSTER TRUCK** Great text reproduction; vibrant colors.

➖ **TONKA TRUCK** Small amount of moiré; no portrait mode.

$1,500, www.dell.com

NEC PA301W

We admittedly put the cart a bit before the horse by featuring NEC's PA301W in our pages twice before finally publishing our review, but while we were researching our Multiscreen Madness feature story (read more at bit.ly/ssCz6w), this 30-inch display breezed through our benchmarks like a Corvette in a box car rally. And after that, we simply had to have it for our Dream Machine (download that issue at bit.ly/rByDtO).

The PA301W's 2560x1600 resolution is the same as the less-expensive Dell U3011, and its base tilts, swivels, and is height adjustable. Unlike Dell's U3011, however, the PA301W can also pivot into portrait mode. It's outfitted with two DisplayPort inputs, two DVI ports (with HDCP), and a single VGA port, but there's no HDMI. The PA301W sports three downstream USB 2.0 ports and two upstream USB ports, so you can operate two computers with one mouse and keyboard connected to the display.

NEC's monitor excelled in each of our benchmarks, particularly DisplayMate's pixel-tracking tests, which can expose digital noise. The PA301W produced a true deep black in the dark grayscale tests; and it aced the color-tracking test. The NEC came out ahead of the Dell in both the static video bandwidth test (which measures a display's ability to produce fine detail), and the static gamma correction test (which evaluates the accuracy of grayscales and color mixtures).

If you can afford the best tools, the NEC PA301W is the right monitor. But we have to suspect Dell will sell a lot more U3011s while making a little less profit per unit.

VERDICT 9

NEC PA301W

➕ **FRIDAY** Portrait mode; true deep black; integrated KVM switch.

➖ **MONDAY** Pricey—really pricey; confusing menu.

$2,300, www.necdisplay.com

Remember, the Titan has both HSPA+ and quad-band GSM networking for your travels.

HTC Titan

Juicy WP7 Mango phone for AT&T's 4G

SINCE THE FIRST wave of Windows Phone 7 devices more than a year ago, new and interesting WP7 smartphones have been scarce. With the recent upgrade to Windows Phone 7.5 Mango, however, the latest offerings from the likes of Samsung and HTC represent a marked improvement for this innovative platform.

HTC's Titan is literally the biggest device in the Windows Phone portfolio. With a massive 4.7-inch diagonal display, the Titan pushes the limits of what most people consider comfortable. While size certainly matters when it comes to the Titan's screen, there's more to the conversation than simply dimensions: With a resolution of 800x480, the display lags behind competitors in both pixel density and color reproduction, but its sheer size makes the touchscreen very usable, as all of its interface elements are super-sized.

The Titan measures 5.18x2.78x0.39 inches—dimensions that limit its practicality: The power button at the top of the device is quite a stretch during one-handed use, for instance, although HTC eased the pain by placing the volume rocker on the right side of the phone, within thumb range. The standard Windows Phone camera button is also on the right, while the left edge houses a Micro USB port.

The Titan features an 8-megapixel camera on its back, assisted by a dual-LED flash. The camera performs admirably, taking quality pictures and 720p video. A front-facing 1.3-megapixel camera can be used with video-chat applications available in the Marketplace.

Under the hood, there's a single-core Qualcomm MSM8255 CPU clocked at 1.5GHz, 512MB of RAM, and 16GB of storage. Windows Phone 7 has always performed well for us, and the Titan's additional horsepower—despite the absence of a second CPU core—only improves the fluid experience. We noticed the additional power most while playing Xbox Live games. In our testing, both The Harvest and Need for Speed: Undercover started much faster, and maps loaded more quickly than on previous-generation hardware.

HTC and AT&T have several useful free-to-use apps in their exclusive areas in the Marketplace. You can remove unwanted pre-installed apps, such as HTC Hub, AT&T Navigator, and AT&T U-verse Mobile, with just a few taps.

The Mango update brings Internet Sharing over Wi-Fi as an optional feature for carriers, and HTC has it enabled for the Titan (although you'll need a compatible data plan). HTC has also added Attentive Phone to the Titan's Settings menu. This uses the Titan's sensors to make your phone behave more intuitively, such as changing or muting the volume of the phone's ringer when it's picked up or flipped over.

HTC has enhanced the camera software, too. The Titan features a panorama mode that not only lets you take sweeping shots, but also assists you in making each frame level and seamless. HTC also added a burst mode that takes multiple high-resolution images sequentially, helping with hard-to-capture shots.

So the Titan is a great portable device, but is it too large to be a great phone? The answer depends on your primary use case. It's a no-brainer if you spend a lot of time web browsing, gaming, messaging, or engaging in similar screen-oriented activities. But if you plan to use the Titan primarily for voice calls (imagine that!), you'll want to invest in a high-quality Bluetooth headset. –TIM FERRILL

VERDICT 8

HTC Titan

+ SIRENS OF TITAN Large, beautiful screen; solid build; decent camera.

− CLASH OF THE TITANS Some usability issues due to size; limited app support (currently) for front camera.

$200 with 2-year AT&T contract, www.htc.com

Audyssey's Lower East Side Media Speakers look as good as they sound, but they don't get very loud.

The "bass boost" switch on Cerwin-Vega's XD3 strikes us as a gimmick tied to its marketing slogan, "The loud speaker company." Fortunately, the switch does no harm to the music.

Speaking of Speakers

Three compact systems aim to rock your desktop

Audio enthusiasts don't live by headphones alone. Be they boxes, cubes, orbs, or ribbons; self-powered or passive, there are times when we need speakers to fill a room with sound. That's the case whether we're gaming, listening to music, or creating our own tracks. Fortunately for us, there's been a lot of activity in the speaker market lately, and we've had the opportunity to check out three very different self-powered two-channel speaker systems. Which ones rock? –MICHAEL BROWN

AUDYSSEY LOWER EAST SIDE MEDIA SPEAKERS

Audyssey is something of a rookie when it comes to designing powered speaker systems, but the company has a well-earned reputation for producing excellent audio-calibration technology for high-end A/V receiver manufacturers such as Marantz, NAD, and Onkyo. Audyssey's engineers made some curious choices when they designed the Lower East Side Media Speakers (we'll refer to them as the LES), but they deliver plenty of bang for the buck.

These are two-way speakers, with 3.5-inch paper woofers, .75-inch silk-dome tweeters, and 4-inch passive radiators housed inside ABS cabinets. The cabinets, which measure 5 inches wide by 6 inches deep, are permanently mounted on thick wire stands that isolate the speakers from the desktop and tilt the speakers up toward your ears. There's a 1/8-inch analog input and an optical S/PDIF on the back of the right speaker, and a 1/8-inch headphone out on the front. The right speaker also houses the Class AB amplifier and a D/A converter. Audyssey demurred when we inquired about the amp's output (telling us the amp delivers 106 dB unweighted peak SPL at 1 meter, but refusing to disclose the amp's output in watts RMS), and the company declined to identify the DAC's make, model, and specs.

The decision to use an inline power brick, instead of housing the power supply inside the same cabinet as the amplifier, reduces the potential for noise contamination. We also applaud the inclusion of an optical digital input, which provides the option of keeping the signal in the relatively noise-proof digital domain until it reaches the speaker. This is great for devices that have S/PDIF outputs (PCs, TVs, set-top boxes like the Boxee Box and the WD TV Live, and the like), but it's not so useful for pairing with most portable digital media players that rely on a USB cable.

The passive radiators on the back of the cabinets help the LES speakers deliver solid bass response. Listening to Peter Gabriel's new orchestral version of "Darkness" from his *Half Blood* album (encoded in FLAC with 24-bit resolution and a 48kHz sampling rate), the LES reproduced the bass violin and cello with warmth without shortchanging higher-frequency instruments such as the flutes and oboe, or compromising the hearty resonance of the French horns and trombones.

The LES speakers aren't limited to near-field performance, but don't expect them to fill a large room with sound. The surprisingly mild amplifier was more than adequate for our 80-square-foot home office, but our 325-square-foot rec room swallowed up its output. They made terrific companions for watching movies on an iPad, too, but we'd recommend something beefier to pair with an HDTV in a home theater. If you're looking for gaming speakers, meanwhile, your $250 would be much better spent on Corsair's rock 'em, sock 'em 2.1-channel SP2500 (read our review at bit.ly/tkEoLo).

VERDICT 8

Audyssey Lower East Side Media Speakers

$200, www.audyssey.com

UFI UCUBE DIGITAL SPEAKERS

Speakers need not be housed in massive enclosures to deliver big sound, especially when they're paired with a subwoofer pumping out meaty bass. UFI's UCube speakers deliver bigger sound than we expected given their size, but they're just not capable of delivering the full-range performance we expect to hear from $150 desktop speakers. We'd score them a little higher if we were

UFI's UCubes are innovative, pretty, and portable. But we don't think full-range sound is too much to ask for when spending a buck and a half.

considering them solely as portable speakers (and if they weren't so pricey—dropping the very attractive brushed-aluminum stands might help on that score).

The 2.5-inch honeycomb-paper drivers inside the injection-molded ABS cabinets are square, flat "balanced mode radiators," not the dish-shaped cones found in more conventional speaker designs. The drivers are based on a design licensed from HiWave Technologies (formerly NXT, a company best known for its pioneering efforts in designing flat-panel transducers). The cabinets have threaded mounts in the back, and UFI provides a pair of thumbscrews and the aforementioned stands that tilt the speakers up toward your ears once they're mounted. The speakers don't provide a headphone output, nor do they come with a remote or even a volume control.

But thanks to an innovative amplifier design, the UCubes also don't require a bulky power supply. The speakers draw the power they need from your computer's USB port (don't bother connecting them to an iPad, though—that tablet can't deliver the 500mA of juice the speaker's amp requires). Both the power supply and the digital amplifier—which also performs some digital signal processing on the source signal—are housed inside the left speaker enclosure. Plug the left speaker into your computer using the provided Mini USB cable, connect the two speakers with the provided RCA cable (both cables are 1 meter long), and you have a very portable audio solution.

The UCubes delivered very good fidelity with high-frequency instruments, such as the keening mandolins on Robert Earl Keen's cover of "Long Chain" (from *What I Really Mean*), and the piano and chimes on Peter Gabriel's orchestral rendition of "San Jacinto" (from *Half Blood*). But when we turned to more straightforward rock-and-roll tracks, such as Paul Thorn's "Crutches" (from *A Long Way from Tupelo*), the electric bass and kick drum that drive that bluesy track lacked the thumping energy they're intended to deliver.

VERDICT 6

UFI UCube Digital Speakers

$150, www.ufiproducts.com

CERWIN-VEGA XD3 DESKTOP SPEAKERS

The Cerwin-Vega brand conjures potent auditory memories for those of a certain age. The company was established in the 1950s, and it peaked in the 1970s, signing endorsement deals with the likes of The Rolling Stones, Davie Bowie, and Peter Frampton. Frankly, the brand hasn't been on our radar since; but Cerwin-Vega has grabbed us by the ears once again with its new XD3 Desktop Speakers.

Now if you're looking for *audiophile* speakers for critical listening sessions, move along—these aren't the best two-channel desktop speakers we've heard, by a wide margin (Bowers & Wilkins' MM-1 retains that honor. Read our review at bit.ly/v4XY9A). But for the price of one pair of MM-1s, you could rock out with a pair of XD3s in the kitchen, the bedroom, the bathroom, the living room, and your home office. Yep, these puppies sell for just $100.

The XD3s are two-way speakers, with a 15-watt-per-channel Class AB amplifier driving a .75-inch silk-dome tweeter and 3-inch polypropylene woofer in each cabinet. The cabinets themselves are fabricated from medium-density fiberboard, with vented bass ports in the rear and thick rubber padding on the bottom to isolate the enclosure from the desktop. The amplifier and power supply are housed in the left-hand cabinet, which is outfitted with stereo phono inputs in back, and a 1/8-inch input and 1/8-inch headphone output in front. This cabinet also has a front-mounted volume control, but there is no remote.

Cerwin-Vega describes the XD3s as providing "compact size without 'compact' sound," but they're considerably larger—and heavier—than B&W's MM-1, and they're slightly larger than Audyssey's LES. And while the XD3s will fill large spaces that would swallow up either of those competitors, the Audyssey and B&W speakers both deliver higher-quality sound. The Blind Boys of Alabama's "Jesus Gonna Be Here" from their *Spirit of the Century CD*, opens with a searing acoustic bass line that will test the mettle of any woofer. The XD3s handled it with aplomb; but when the electric guitar and vocal entered the mix, the Audyssey LES delivered vastly superior fidelity. And while both speakers are outfitted with the same size tweeters fabricated from the same material, the XD3s struggled with high-frequency sounds, such as the closed high-hat cymbal on this same track.

Of the three systems reviewed here, the Cerwin-Vega XD3 delivers the absolute best price/performance ratio, but the Audyssey LES sounds better, justifying its $200 street price. As for UFI's UCubes, we'd have a hard time pulling the trigger on them.

VERDICT 9

Cerwin-Vega XD3

$100, www.cerwinvega.com

SteelSeries Sensei

Don't let its simple looks fool you—this mouse is a silver bullet

MOUSE MANUFACTURERS at the high end of the gaming market don't always exhibit the best design sense. With each new generation, they seem to cram more buttons, lights, and increasingly dubious features into ever more extreme-looking rodents. The SteelSeries Sensei is a refreshing departure from that trend.

The Sensei's simple, ambidextrous design (sorry palm-grippers, this isn't an ergonomic mouse) calls to mind the classic Microsoft Intellimouse optical mouse. Its top is coated with a silvery metallic finish that looks good and feels great. It's just a bit grippier than standard plastic, and fingerprints and grime don't accumulate because it's not glossy.

Unlike some other mice, the Sensei doesn't bristle with an incredible amount of buttons. In addition to the standard left, right, and scroll wheel, there's one profile toggle and two other buttons located symmetrically on each side. That means only two of the extra buttons will be comfortably accessible to most gamers (unless you're blessed with an especially dexterous pinky). If you like to have a wide range of customizable mouse commands at your disposal, this probably won't meet your requirements.

The Sensei's minimalist exterior belies its sophisticated innards. A 32-bit ARM processor gives you the ability to customize the mouse's sensitivity, path correction, polling rate, acceleration, and even how high you must lift the mouse above a surface when you want to reposition it without tracking. Each of these settings is stored on the mouse, eliminating the need to install a utility or even a driver on your computer.

How can you customize the mouse without client software? By using the LCD on the bottom of the mouse, of course! This is one of the cooler features we've seen in a long time. You can customize all the mouse's sensor settings—and create multiple profiles—right on the device, using just its DPI button, scroll wheel, and built-in monochrome display. To go further than that, you will need to install SteelSeries' configuration software. Once you've done that, you can change the color of the mouse's lights, rebind keys, and change the default image displayed on the mouse's screen.

SteelSeries has an innovative and sophisticated mouse here. If you're not looking for a million buttons or a swoopy, ergonomic design, the Sensei won't disappoint. –**ALEX CASTLE**

VERDICT 9

SteelSeries Sensei

SPLINTER Exceptional driver-free sensor customization; nice finish and good aesthetics; ambidextrous.

SHREDDER Relatively few buttons; non-ergonomic design isn't great for palm-grippers.

$90, www.steelseries.com

The Sensei's metallic surface is more than attractive—it's grippy and durable, too.

Call of Duty: Modern Warfare 3

Comfortably familiar, for better or worse

INFINITY WARD'S LATEST Call of Duty game is a fitting finale to a season chock-full of blow-your-socks-off-epic first-person shooters. While it does lean heavily on a winning formula, Modern Warfare 3 delivers a knockout multiplayer experience that we can recommend without hesitation.

Note our emphasis on the multiplayer experience. MW3's single-player game is a whole other matter. The indoor environments in particular reveal that Infinity Ward is bumping against the limits of a dated game engine. Character models lack the fluid quality we've seen in this game's primary competitor, EA's Battlefield 3, and textures get badly washed out up close. Thankfully, most of the game unfolds in outdoor environments, with set pieces featuring jaw-dropping backdrops. The lighting effects, particularly the sunbeams and explosions, are top-notch.

But from the first single-player mission, it's clear that Infinity Ward went out of its way to craft an experience versus a game. On the upside, this decision renders MW3 the most movie-like COD game ever crafted. A gunfight that plays out in a plummeting 747—complete with wildly shifting gravity—is just one of many examples. Whether you're manning a remotely controlled drone packing dual .50 cals, or blasting away at enemies from an AC-130 gunship, you can wreak plenty of havoc within this game's world.

But it doesn't take long to notice just how on-the-rails MW3 feels. You run, you shoot, you take some damage, you get cover, you heal, and then you shoot some more. The single-player experience presents no real challenge to the player—you're like an actor in a movie directed by a tyrant who won't tolerate the slightest deviation from the script. Each time you try, you get killed and must take the scene from the top. To make matters worse, the script is a convoluted mess filled with gratuitous references and tie-ins to earlier games in the series.

But few informed gamers will pick up Modern Warfare 3 for its single-player campaign; it's the phenomenally frantic multiplayer experience—the rewards you earn for your hair-trigger reflexes and game-dominating kill streaks—that renders this investment worthwhile. The more you play and the more you kill, the more awesome gear you can unlock for your warrior.

MW3 delivers 16 maps with support for up to 18 players. In addition to the quick-paced team deathmatch and CTF games, Infinity Ward has added several new modes of play, including Kill Confirmed Mode, in which you can score points only by plucking the dog tags off vanquished foes. This forces you into refreshingly slow and deliberate decision making while your squad moves from one strategic point of cover to the next, laying down suppressing fire for whichever teammate is brave enough to venture into the open to collect the tags.

Call of Duty: Modern Warfare 3 is comfortably familiar, with just enough enhancements to make it worth buying. It won't win any awards for innovation, but it is the most cinematic COD game yet, it delivers the most robust and fully realized multiplayer experience of any game in the series, and it's deep enough to keep you interested for months on end. –**ALAN FACKLER**

The engine may be slightly dated, but some of the set pieces are absolutely phenomenal.

Yes, you actually get in a firefight in a falling jet. It's insane.

VERDICT 8

Modern Warfare 3

+ MICHAEL BAY Fun, fast, and frantic multiplayer; extremely cinematic single-player; mind-blowing set pieces.

– MICHAEL BAY Very little innovation on display; game engine is showing its age; on-the-rails single-player experience.

$60, www.callofduty.com/mw3, ESRB: M

LAB NOTES

ALEX CASTLE **ONLINE MANAGING EDITOR**

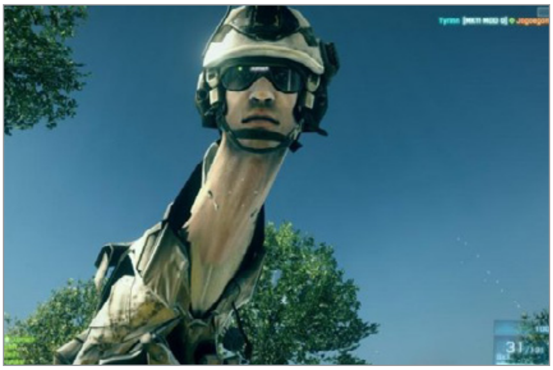
To Patch or Not to Patch

How hard should we be on buggy games with quick fixes?

LIKE IT OR NOT, the day-one patch has become an accepted part of the PC (and even console!) video game development cycle. As a player, it's a pain, but as a game reviewer, it can be a nightmare.

How much should we dock games for bugs that we know or suspect won't even be an issue for gamers by the time our magazine is on the shelves? We'd love to be able to wait until a game is in a more stable form before reviewing it, but we also want to reach readers before they've made up their minds on whether to buy a game.

So do we take the principled stance that says developers should be punished for releasing a buggy game, or the practical one that says we do a better service to our readers by scoring the game as they'll play it? It's a tough question, and one I'm still trying to figure out the answer to—I'd love to hear what you think, so send an email to comments@maximumpc.com with your position.



Markkus Rovito
Senior Editor

While comparing the Kindle Fire and the Nook Tablet, I got hooked on the Send to Kindle extension available for all major web browsers. In two clicks, it emails web articles to your custom Kindle address. Sync the Kindle, and those long-ass articles taking up tab space on your browser are now in the palm of your hand. Get it at www.klip.me.

Nathan Edwards
Senior Editor

Half of my brain is trying to convince the other half that I need an Ultrabook. I won't get one, though, until there's a truly great one available. Until then, I'll be trying my damnedest to make my 2.5-year-old netbook usable again. My current genius idea: Linux Mint 11 LXDE. Sudo buy me an Ultrabook.

Amber Bouman
Online Features Editor

I've been playing around with Siri—the personal assistant on the iPhone 4S. So far, I'm not impressed: Siri has failed me pretty much every time I attempt to get her to do something, from pausing music, to sending a text message, to finding a local sandwich shop. Siri must be short for "Siri-ously useless" because so far, that's what she is.

Alan Fackler
Associate Editor

You've got to give mad respect to Senior Editor Nathan Edwards. In between a massive workload, a strict production cycle, and constant testing and building, Nathan somehow still managed to complete The Elder Scrolls V. Had I been under that much pressure with such little free time, I may have wound up blowing my brains all over Skyrim before completion.

Michael Brown
Reviews Editor

I live on a 10-acre parcel of land; but it isn't enough for my 80-pound mutt, who insists on jumping our barbed-wire fence to see what the neighbors are up to. So I was jazzed to hear about the Tagg Pet Tracker. It's a GPS unit that attaches to your pet's collar, so you can locate the animal on a website map. I'm not ready to recommend it here, but you can read my full review at bit.ly/ty7hQc.

LETTERS

WE TACKLE TOUGH READER QUESTIONS ON...

> Component Pricing
> Intel Bias?
> OEM Windows 7

Ford vs. Chevy?

Recently I've had increasing troubles with your articles, as I feel the staff (mostly the senior staff) have become extremely out of touch with the current PC culture. Usually I'm pretty understanding about this. All of our brains start to solidify at a certain point and become less receptive to new concepts. There's no way I could convince two old men arguing Ford vs. Chevy that both companies now make cars inferior to those made in Korea.

Where I draw the line, though, is when someone claiming to be authoritative gives misinformation that is harmful to others. Case in point is a letter from a few months ago where a reader criticized your listing the i5-2500K as a budget CPU in your Best of the Best list. The reader was absolutely right and you were absolutely wrong for the exact reasons you yourselves stated. You claimed the i5 was better than a cheaper AMD part because of overclocking, forward compatibility, and performance/price. A Phenom II 970 BE objectively beats the 2500K in every one of those categories: high overclock ceiling at low heat, benchmarks over 80 percent of the 2500K in most cases, at less than half the price. And AMD will always be better about slot compatibility than Intel. So if we're talking only numbers here (which are quantifiable) and not opinions (which are subjective), you were wrong.

—Ryan LeCocq

DEPUTY EDITOR GORDON MAH UNG RESPONDS: Unfortunately, life is not always about simple explanations. This very much depends on what your definition of "budget" is and what you will use the chip for. At *Maximum PC*, we're chartered with performance first, and even our definition of "budget" is tinged with a performance slant. I believe the reader's main problem was that he didn't consider $216 to be budget. I can understand that. Perhaps we should actually change our label to "budget performance."

I still stand behind our recommendation of the Core i5-2500K as the budget performance chip, because Intel's lineup doesn't give you anything with unlocked multipliers below the 2500K, and having the overclock option is worth it on Sandy Bridge. The P-II X4 970 isn't actually half the price of the 2500K. The latest AMD and Intel price lists peg the 970 at $155 vs. $216 for the 2500K part. I haven't looked at 970 performance in a while, but it couldn't even compete with Intel's obsolete Core i7 Lynnfield parts. Just browsing the web, I'm seeing that the 2500K is easily anywhere from 65 percent to 35 percent faster than the 970. If someone asks me what to buy with a CPU budget of $150 to $200, I'll stick to the Core i5-2500K any day of the week if that person cares about performance first.

CUT, COPY, PASTE

→ In the Tech Preview story in our Holiday 2011 issue, the CPU chart incorrectly identified AMD's Phenom II X6 1100T as having 904 billion transistors, when it should have said "million."

→ In our Holiday 2011 antivirus roundup, the comparative features chart said Webroot does not contain Identity Protection, when in fact it does.

→ In our January 2012 Build It article, we incorrectly listed the Core i7-3960X as costing $100 (we wish!), when it should have said $1,000. The total cost of the build, however, was correct.

With Prices Like These...

In the Holiday 2011 issue you built a Battlefield 3 rig, and the price you had listed for the 7K3000 2TB drive is not even close. The lowest price I found it for was just over $200 on Amazon, and the majority of the sites, if they even have it, list it at more than $300.

I don't know if you know what happened in Asia, but prices on mechanical hard drives have gone way up recently. On the flip side, the majority of the rest of the items you have listed appear to actually cost less on sites like Newegg.com (the primary site I use for builds), so you might want to compare the prices they have listed to the ones in your article.

Anyway, the article was great, and I may just go with that configuration for my next build. If you do happen to know where I can score a 2TB drive like that for $120, please let me know. Thanks.

—Adam Smith

SENIOR EDITOR NATHAN EDWARDS RESPONDS: Hard drive prices started skyrocketing as our Holiday 2011 issue went to print—too late to be reflected in the BF3 rig I built. In our January issue, we reported on the floods in Asia and the hard drive prices in the builds

↘ submit your questions to: comments@maximumpc.com

and reviews in that issue more accurately reflect the prices at the time.

All build prices should be understood to be approximate; component prices on Newegg and elsewhere vary from month to month and even week to week, but all prices are accurate as of the time that the story is written. If you can find them for less than I did, that's awesome!

Newer Not Necessarily Better

I haven't been reading since *boot*, but I have been a subscriber or newsstand purchaser since about 2004. *Maximum PC* is my primary trusted source for tech news, honest reviews, and general insight into the buzz of the tech world. I love your witty +/- captions on the reviews.

I have to point out something I feel may be a small omission on your part. I recently built a new machine that included a Plextor PX-LB950SA drive. When I received my December issue, I saw that the B940SA is still on the Best of the Best list, as it is online in the same section. Unless I'm mistaken, the 950 is a direct replacement that's newer, slightly faster, and offers LightScribe. Certainly, it must be worthy of this title?

—Tom Rand

EDITOR-IN-CHIEF KATHERINE STEVENSON RESPONDS: I can see why you would make that assumption about the newer drive, Tom. But when I tested Plextor's PS-LB950SA in our October 2011 issue, I was disappointed to find that it could only hit its top-rated DVD+R burn speeds with Sony media, while the B940SA hits faster-than-disc-spec speeds with Sony, Panasonic, and Verbatim media, and is also faster at ripping DVDs. The older drive is still available for purchase, and it remains my pick.

Gaming HTPC CPU Choice

Just read your Gaming HTPC article (December 2011). Why the stock cooler? In my experience, these are super noisy and would ruin the point of a living room machine. And why the addiction to Intel chips? Wouldn't this machine call for one of the new AMD FX chips? It would probably offer similar performance for less money.

—Steve Massey

SENIOR EDITOR NATHAN EDWARDS RESPONDS: The stock Sandy Bridge coolers actually aren't that noisy, but I agree that it would have been better with an aftermarket cooler. As for the AMD FX chips, they weren't yet available when I built the PC, but that sounds like a great idea for a future Build It.

Upgrade > OEM Win7

Many times y'all use OEM Windows 7 discs, even though they may not transfer to another motherboard or machine. I think y'all should mention the alternative of doing a clean install using upgrade media. The hack for doing it can be found on Paul Thurrot's Windows SuperSite (www.supersite.com). Yes, going this route costs a little bit more, but should cause less problems when changing out motherboards or moving to a different machine.

—Steve Jernigan

DEPUTY EDITOR GORDON MAH UNG RESPONDS: It is correct that Microsoft may clock-block you on reinstalling an OEM copy when you switch motherboards, but the company is usually pretty lax about it. We also don't want to overly complicate an install process, particularly for newbs, as most people who build their first rig are happy just to get it to POST the first time. The upgrade path is valid, but an even better deal is the family pack. That gets you three Windows 7 Home Premium upgrade licenses for about $145.

[NOW ONLINE]

20 GREAT GAMES FOR UNDER $20

In today's gaming landscape, where so many of the must-have new releases launch at 60 dollars, it's great that the PC is loaded with a ton of affordable alternatives. There are a lot of great games out there that cost less than 20 bucks apiece. Who cares about Battlefield 3 when we can get three, four, five, or even more games for the same price? True diamonds, but with a cubic zirconia price tag, these games span a variety of genres, from turn-based strategy to first-person shooters to tower defense. They're all great games, and all cost less than 20 Washingtons. bit.ly/srxYYT

[NEXT MONTH]

COMING IN MAXIMUM PC's

THIS SPACE WILL BE UNLOCKED IN ONE MONTH MARCH ISSUE

Hardware Hacks

We'll show you amazing DIY projects that can help you get more power and/or functionality from your gear!

Build an $800 PC

Deputy Editor Gordon Mah Ung will walk you through the process of choosing the parts and putting together an all-purpose rig you can be proud of.

2011 Gaming Awards

Join us for our annual tradition of recounting the best of times and worst of times in PC gaming over the last year.

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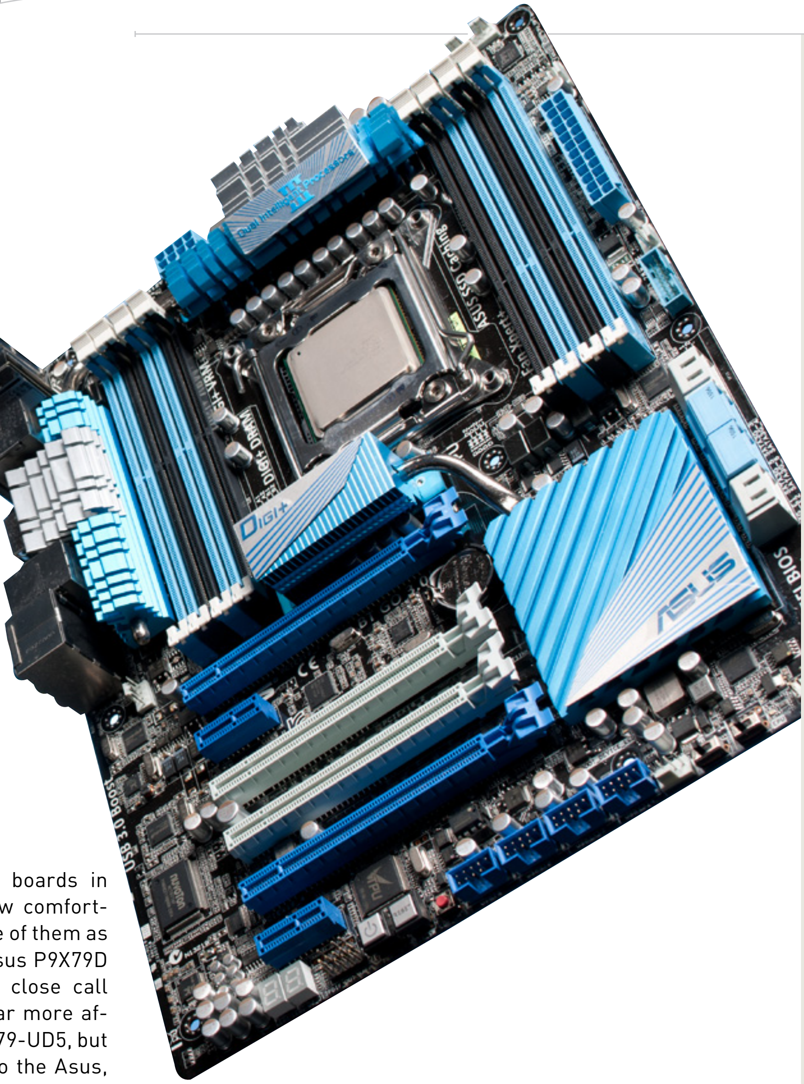
HARDWARE



LGA2011 MOTHERBOARD

Asus P9X79D Deluxe

We've seen three X79 boards in our Lab, and we're now comfortable recommending one of them as Best of the Best: the Asus P9X79D Deluxe. It was truly a close call between this and the far more affordable Gigabyte GA-X79-UD5, but we're giving the edge to the Asus, given the performance gaps we saw between the two. The P9X79D features all the amenities you'll need when building into Intel's new flagship platform, and it will even let you flash the BIOS without a CPU in its socket. It is pricier than we expected for this category of board, but we've been pretty durn happy with our unit thus far.

www. asus.com

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Air Cooling
Cooler Master Hyper 212 Evo
www.coolermaster.com

High-End Cooler
Prolimatech Armageddon
www.prolimatech.com

Blu-ray Drive
Plextor B940SA
www.plextor.com

Full-Tower Case
Corsair 800D
www.corsair.com

Mid-Tower Case
Corsair White Graphite Series 600T
www.corsair.com

Midrange Display
LG E2370v
www.lg.com

For even more Best of the Best entries, such as speakers and budget components, go to www.maximumpc.com/best-of-the-best.

GAMES WE ARE PLAYING

The Elder Scrolls V: Skyrim
www.elderscrolls.com/skyrim

Batman: Arkham City
www.batmanarkhamcity.com

Terraria
www.terraria.com

Star Wars: KOTOR
bit.ly/tVffnz

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